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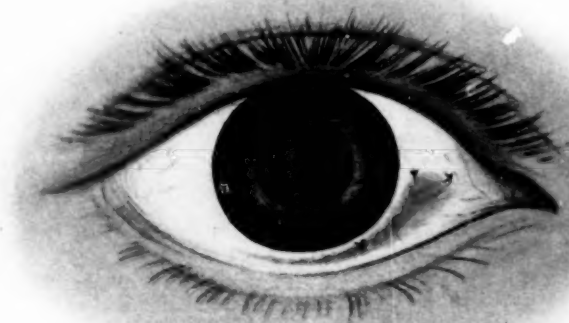


FIG. 1.—CONJUNCTIVAL PHLEGMON ONE DAY AFTER OPERATION.



FIG. 2.—APPEARANCE OF EYE TWO DAYS AFTER OPERATION.



FIG. 3.—CONDITION SEEN AFTER FOUR DAYS.

PHLEGMON OF CONJUNCTIVA FOLLOWING OPERATION FOR PTERYGIUM (KIEHLE).

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PHLEGMON OF THE CONJUNCTIVA FOLLOWING OPERATION.

FREDERICK A. KIEHLE, A.B., M.D., F.A.C.S.

PORTLAND, OREGON.

This is the report of a case in which a simple operation for pterygium was followed by loss of the eye. The only organisms found were a few streptococci and staphylococci not pathogenic for animals. Read before the Pacific Coast Oto-Ophthalmic Society, July 15, 1921.

The following case, one of the most distressing the writer has ever had to deal with, is important as illustrating what can happen despite the greatest precautions, with usual technic and under conditions ordinarily accepted as aseptic. For this reason, and because I fail to find in ophthalmic literature or in the practice of my confreres record of any similar experience, I am impelled to make this report.

Mrs. C., aged 35, consulted me November 9, 1920, regarding a small pterygium of her right eye in the usual position at the inner side of the limbus. The growth was small and there was no interference with vision, which was normal. Only cosmetic reasons and the constant curiosity of her friends and acquaintances regarding the growth induced her to seek consultation.

Operation was not urged and it was carefully explained that the growth was innocuous and might never interfere with ocular function. However, on December 29, she reappeared with her husband and requested operation. As she was from out of the state and only visiting friends in Portland, she asked to go to a hospital. I mention this because we are accustomed to operate on pterygia in our office surgery.

Arrangements were made at the Portland Eye, Ear, Nose and Throat Hospital for operation the following morning. No preliminary culture of the contents of the conjunctival sac was made, as is our custom before proceeding with the more important ophthalmic operations. In the surgery,

however, the eye was given as careful preparation as for an intraocular section. There was nothing unusual in the appearance of the eye or the accessory structures. Lids and conjunctiva were normal and tear sac negative. The technic of the operating room was absolutely beyond criticism.

After careful cleansing of the lids, and irrigation of the conjunctival sac with boric acid solution, anesthetization was produced by three instillations of a single drop of 5% cocain solution at five minute intervals. One drop of adrenalin solution (1/1000) was placed in the conjunctival sac a moment before inserting the speculum.

The operation was a simple implantation of the pterygium subconjunctivally below the cornea. The usual anchor suture of double threaded black silk held the growth in place and two small sutures of similar material closed the conjunctival wound. The whole procedure was as simple as usual, and occupied but a few moments. The patient was ideal in behavior and absolutely no untoward situation arose. A mild antiseptic ointment was placed between the lids and the eye dressed. The patient remained in the hospital resting quietly for a few hours and then returned to the home of her friend.

The following morning she appeared at my office for dressing with the statement that she had suffered all night with severe pain of a burning character in the region of the operated eye. Upon removing the dressing both lids were found to be intensely swollen and

red. The swelling extended toward the temple and there was tenderness of the preauricular gland. A very small amount of yellow secretion appeared on the lid margins. Upon separating the lids this extraordinary picture presented itself: The cornea was clear and bright but the region of the operative wound was transformed into an area of conjunctival slough 4 to 5 mm. wide, starting at the inner limbus and extending below the cornea almost half way around the eyeball. This slough was separated from the cornea by an area of conjunctiva 2 or 3 mm. in width, hyperemic but otherwise normal. The appearance of the phlegmon was in color much like that of a pharynx the third or fourth day after enucleation of a tonsil. (See Plate XI, Fig. 1.)

The sloughing area was cauterized with a 10% silver nitrat solution. The patient was immediately returned to the hospital and given continuous special nursing. The eye was irrigated hourly with a 1/10,000 bichlorid solution alternating with normal saline, followed by the instillation of 20% argyrol. Hot packs were applied to the lids and adjacent region and changed with frequency. Despite this and other vigorous treatment suggested by consultants, the condition advanced rapidly. The leucocyte count was 23,000, showing 91% polymorphonuclears.

The next day the phlegmon encompassed nearly two-thirds of the cornea while remaining about the same distance from it. (Fig. 2). In another twenty-four hours the limbus was entirely encircled altho the cornea itself remained unattacked. (Fig. 3).

In another forty-eight hours, however, accompanying a marked congestion of the narrow strip of conjunctiva lying between the phlegmon and the limbus, an annular corneal ulceration appeared, which, despite every attempt to delimit it, spread rapidly, covered superficially the entire surface and soon eroded the substantia corneae.

With the onset of the corneal ulcer there developed an iridocyclitis, and

soon, with a lens lying in the anterior chamber it was only too evident that the fight was lost, and the eye was enucleated 22 days after the pterygium operation. Careful search failed to reveal any orbital pus pockets.

The enucleated eye presented the following appearance: the cornea was entirely gone, the eye was shrunken and exceedingly soft. The sclera was greatly thickened at the limbus and there was no conjunctival tissue for a distance of 5 or 6 mm. back of the limbus. The vitreous appeared clear.

The day following enucleation the patient had severe attacks of vomiting with a pulse of 60 and a temperature of 99.6° to 100.6°. The lids and orbital tissue were intensely swollen and there was much purulent discharge from the orbit. There was no headache, pupillary disturbance or other symptom suggesting meningeal involvement.

The next day nausea and vomiting were less and by the third day had disappeared. The reaction of the orbital tissues was still tremendous and pus flowed in abundance from between the lids, gradually subsiding as the days went by.

A thoro systemic examination of the patient by a competent internist had been entirely negative. A Wassermann and urinalysis threw no light on the condition. The patient's personal history and that of her husband were good. The sinuses were clear. Repeated smears of the rather scanty purulent discharge from the sloughing area, examined at two different laboratories, showed no gonococcus and no pneumococcus. There was invariably present, however, a streptococcus and a staphylococcus, neither one abundant.

The following is the report of the pathologist: "A rabbit was injected intravenously with a mixed culture from broth from aerobic and anaerobic tubes. It was also injected intravenously with pus from the patient's eye with no results. The rabbit was observed for several weeks and posted. There were no joint lesions, no kid-

ney lesions and no endocarditis. A guinea pig was injected intraperitoneally on January 27, 1921, with pus from the patient's eye and on February 10, injected intraperitoneally with a mixed culture without results. It was observed for six weeks and posted. No gross or microscopic pathologic lesions were found."

Smears from the unaffected eye and from the nose failed to give these organisms.

With the hope of reproducing this condition experimentally my associate, Dr. Ira E. Gaston, made a conjunctival wound of the eye of a guinea pig, rubbing in the same mixed culture. In the other eye in a similar wound he inserted sutures of the same nature as those used in the patient's eye with view to the possibility of finding that the silk was at fault.

Neither eye showed more than the slightest reaction.

The origin of this infection is still unsolved. Careful analysis of every

step of the operating room procedure throws no light upon the problem. Immediately following this implantation and with exactly the same operating room technic, my associate and I did a corneo-scleral trephining. This patient showed absolutely no reaction and made a prompt recovery.

A study of the diet of the patient preceding the time of operation has been made, having in mind the possibility of absence of necessary food elements. These findings are negative.

The original area of slough suggested in appearance a trophic disturbance such as might follow the tying off of an artery or nerve supplying the region, were this conceivable.

One is forced to the conclusion that the unfortunate sequence resulted from (1) the implantation of ordinary pus bacteria of probably slight virulence and with low pathogenicity for animals, (2) traumatized ocular tissues of unusually low resistance.

GUNSHOT WOUNDS OF BRAIN WITH VISUAL FIELD DEFECTS.

G. E. BELLWS, M.D.

KANSAS CITY, MO.

Three cases of the kind are here reported with discussion of the localization of such lesions. Read before the Colorado Congress, July 29, 1921.

It has long been known that the visual cortex, that portion of the cerebral cortex subserving the retinal function, is in the posterior portion of the occipital lobe, but it is only comparatively recently that it has been accurately delimited.

It is now definitely known to be restricted to the region of the calcarine

lin with the French, and Axenfeld and Uhthoff with the German armies; and these seem to have put our knowledge of localization within the visual cortex on a fairly firm basis.

To determine what structures have been injured, the landmarks and procedure suggested by Holmes and Lister may be followed.

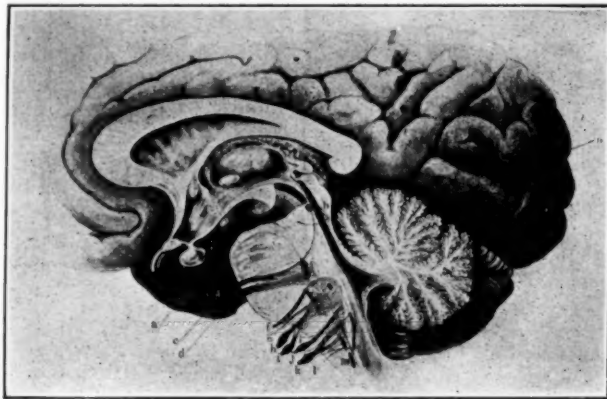


Fig. 1.—Median section of brain, showing a calcarine fissure and visual cortex of the occipital lobe.

fissure on the mesial surface, extending back to the tip of the lobe and probably a little onto the lateral surface. (Fig. 1). It corresponds accurately with the so-called "area striata" or region of Gennari's line, in which area the cortex differs histologically from the rest of the cerebral cortex. There has still been, however, some disagreement among investigators as to the location within this area of points corresponding to certain points in the retina.

During the world war a large number of cases of defect of the visual field resulting from gunshot wound of the brain came under observation, and many cases have been reported.

There is a substantial agreement in conclusion drawn by Holmes and Lister, with the British, Marie and Chate-

In a brain of average size the posterior end of the calcarine fissure is about $2\frac{1}{2}$ cm. above the inion, or posterior occipital protuberance, and extends forward horizontally about 6 cm. (Figs. 2 and 3). The visual cortex surrounding the fissure thus forms roughly a cylinder around this line as an axis.

The structures involved in gunshot injuries are determined by careful measurement of the wounds of entrance and exit, (in traversing wounds the path of the projectile is a straight line), by radiograms of missiles lodged in the brain, and by radiograms of depressed fractures in gutter wounds. In cases seen early, it may be difficult to distinguish the results of direct traumatism from symptoms due to concussion, hemorrhage, or edema,

more wide spread, but many of these cases were followed for months, and examined after all transient symptoms had disappeared.

ula and that this relationship is maintained for a considerable distance forward along the optic radiations.

I wish to report three cases of gun-

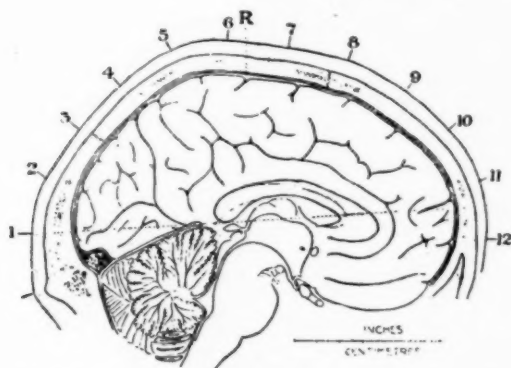


Fig. 2.—Diagram of mesial surface of cerebrum. Calcarine fissure and visual cortex opposite 1 and 2.

The conclusions drawn by Holmes and Lister (*Brain*, v. 39, June, 1916) which are in general agreement with those of a majority of writers, are:

1. That the upper and lower borders of the calcarine fissure correspond to

shot wound of the brain with visual field defects which came under my observation in the U. S. A. Base Hospital at Ft. Riley, Kansas, and in which the same method of study leads to similar conclusions.

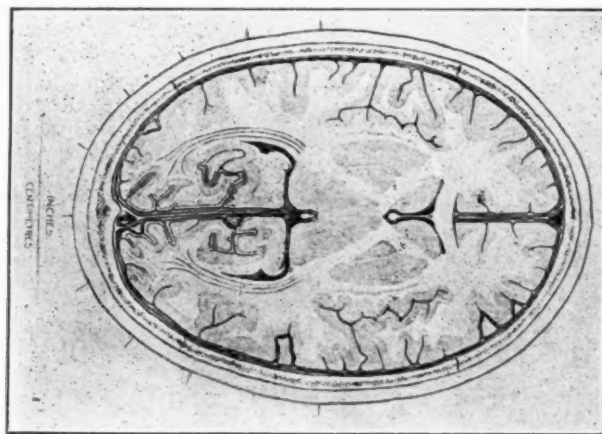


Fig. 3.—Horizontal section of cerebral hemispheres, showing optic radiations.

the upper and lower halves of the same side of the retina.

2. That the macula is represented in the extreme posterior tip of the area, perhaps extending a little onto the lateral surface.

3. That the visual cortex, from before backwards, represents the retina from the periphery inwards to the mac-

CASE 1. F. B., Pvt., 24 years, seen first July 7th, 1919. On Nov. 1st, 1918, while serving a M. G. on the Argonne front, was struck in the right occipitoparietal region by a fragment of H. E. shell. Did not become unconscious for about 3/4 hour. Helped dress the wounds of his companions and then fainted. Was unconscious about 3

days. Was operated upon at Mobile Hospital No. 44 on day of injury and portion of skull removed. Remained in Mobile Hospital 16 days and was

more than 4 months time that elapsed between the injury and the relief from suppuration.

The abscess, limited by the mem-

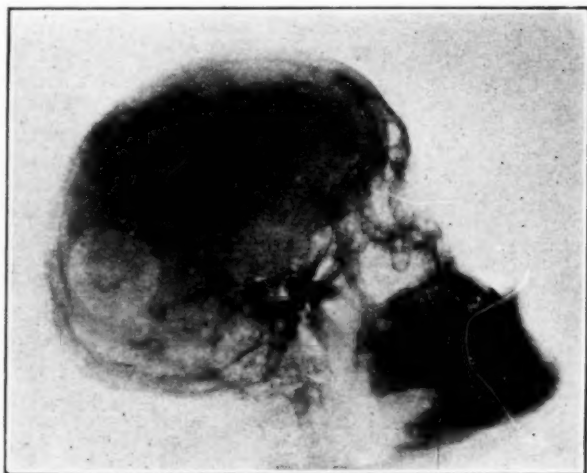


Fig. 4.

then evacuated to the rear and home, reaching General Hospital No. 11 at Cape May, March 7th, 1919. The wound had not then healed and he had a hernia cerebri. He was operated on

branes, did not pass beyond the median line.

I saw this patient on Dec. 19th, 1919 and the condition was unchanged.

CASE 2. V. H. Cpl. 27 years, first

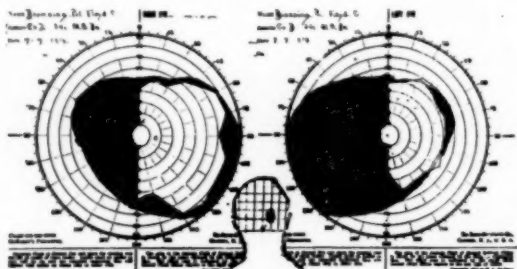


Fig. 5.—Fields of vision of Case 1, showing homonymous hemianopsia complete except around the fixation point. Diagram in middle indicates position of wound as seen from behind.

again April 10, 1919, and 3 small pieces of bone removed with the escape of considerable pus. (Fig. 4).

Prompt recovery followed with V. O. U. 20/15 and there is no impairment of motion or sensation.

This patient, as shown by his chart, had a left hemianopia, complete except for about five degrees around the macula. (Fig. 5) Doubtless the entire right visual area was absorbed in the

seen Feb. 12th, 1919. On Oct. 12th, 1918 in the Argonne Forest, the soldier was struck in the right temple by a fragment of H. E. shell. He was unconscious for about 48 hours, and dazed for several days later.

Was sent to a base hospital where he was trephined over the right occiput and a quantity of pus drained from a cerebral abscess. Recovery was reasonably prompt but the soldier

could not see objects in the left field and could get about better at night than in day time. Could not read at all while in France but can read a little now.

About $1\frac{1}{2}$ disc diameters below disc is a group of pigmented patches in the retina, probably hemorrhagic.

The left disc is pale especially the temporal half. He was told in France

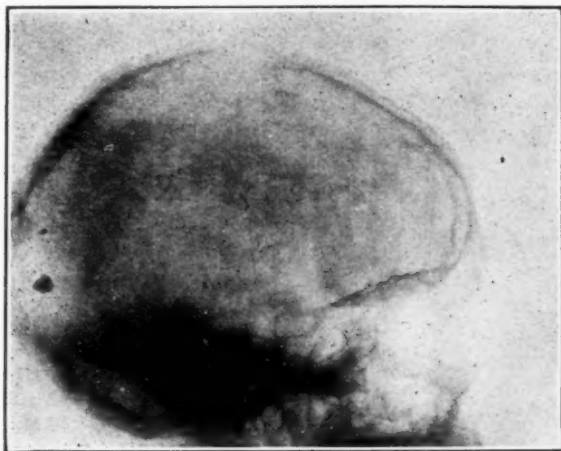


Fig. 6.—Radiogram of Case 2. Light area above shows point of entrance. Light area near occiput shows trephine opening and fragment of metal lying in the wound.

There is a scar $\frac{1}{2}$ inch in diameter one inch above the middle of a line drawn from the outer angle of the right orbit to the auditory meatus.

The radiogram shows a cranial de-

fect at point of entrance, with small particles of bone and metal in the brain, a defect at the trephine opening in the right occiput, and a fragment of shell about one-half by one-half, by one-fourth inches, in left occipital lobe of brain. (Fig. 6).

that he had choked disc. This patient had a moderate general contraction of the fields and a marked quadrant defect—upper left. (Fig 7). The quadrant defect corresponds to the site of

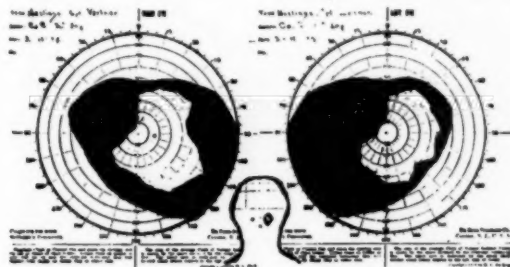


Fig. 7.—Fields of vision, Case 2. Upper left quadrant defect corresponds to cerebral abscess. Diagram in middle shows site of abscess as seen from behind.

fect at point of entrance, with small particles of bone and metal in the brain, a defect at the trephine opening in the right occiput, and a fragment of shell about one-half by one-half, by one-fourth inches, in left occipital lobe of brain. (Fig. 6).

V. O. U. 20/30, pupillary reactions all normal, refractive media clear.

Right disc paler than normal resembling beginning simple atrophy.

the cerebral abscess, on the right side below the level of the calcarine fissure, and the peripheral defect can be ascribed to damage to the anterior portion of the visual cortex or optic radiations during the passage of the shell fragment from the right temporal to the left occipital region. Hemorrhage into the retina was probably due to concussion, and the choked disc to the cerebral abscess.

CASE 3. J. G. Cpl. 20 years, first seen Jan. 13th, 1919. On Sept. 29th, 1918, on the Verdun front, the soldier was wounded by a machine gun bullet which entered the left parieto-occipital region, 1 1/2 inches above and behind the auditory meatus and came out at the same location on the right side. The bone was considerably shattered. He was unconscious six days during which time he was operated on and several pieces of bone removed.

tex is supplied in the main by the posterior cerebral artery, but that the macular region lies in the dividing line between the areas of the posterior and middle cerebral arteries. Necrosis or occlusion of the posterior cerebral artery would cause hemianopias; but if the middle cerebral were not affected, the posterior tip and the macular field would naturally escape.

2. Defects of the lower field from gunshot wound are much more com-

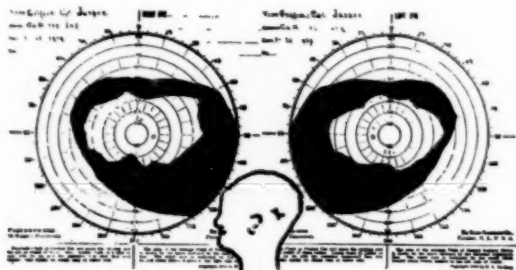


Fig. 8.—Fields of vision of Case 3. Diagram in middle, cross shows point of entrance of bullet, which cut optic radiations causing impairment of peripheral field.

I have not been able to obtain the radiogram in this case, but if we assume from the measurements given, that the projectile in traversing the brain injured the anterior portion of the visual cortex and the neighboring optic radiations, we should expect a defect in the peripheral field, and that is what is shown by the chart. (Fig. 8.)

The chief annoyance in this case is from the defect in the lower field which materially impairs the patient's walking and running.

These charts were all made on a McHardy perimeter, using a 10 mm. disc on a bright day.

Two or three interesting points may be noted in conclusion.

1. The frequent escape of the macular region in hemianopias due to disease of the occipital cortex, for a long time a puzzle to ophthalmologists and neurologists, is readily understood when we consider that the visual cor-

mon than those of the upper field,—This is plainly due to the fact that the lower portion of the visual cortex is in close proximity to the cerebellum and great sinuses, and wounds of this region are much more likely to be fatal—the upper quadrant defect in case 2 of this series was due to abscess formation and not to direct traumatism.

3. One thing which I only recently noticed, and I do not remember to have seen it mentioned elsewhere, is that in all these charts, the two fields are quite symmetric, but where there is any difference, the left is smaller.

It is my custom as a matter of routine to examine the right field first, and I believe the element of fatigue was the cause of the less prompt recognition of the moving object by the left eye. If the right and left eyes had been examined on separate days, I believe the fields would have been more nearly the same.

PERIPHERAL IRIDOTOMY (CURRAN) IN THE TREATMENT OF GLAUCOMA.

HAROLD GIFFORD, M.D., F.A.C.S.

OMAHA, NEBRASKA

An experience with this operation including thirty eyes forms the basis of this paper. The technic is described with modifications based on such experience. The theoretic basis for such an operation is discussed, with objections that may be urged to the theory. The paper was read at the Colorado Congress July 29, 1921, but a note embodying subsequent observations is added.

In the Archives of Ophthalmology, March, 1920, p. 131, and again in the Transactions of the Ophthalmic Section of the American Medical Association (1920 p. 75), E. J. Curran of Kansas City, presented a theory of certain forms of glaucoma, with a method of treatment, which in the opinion of the present writer constitutes one of the most important contributions to the subject since the time of von Graefe. His theory, in brief, is that in the majority of cases of quiet chronic glaucoma, and perhaps in acute cases also, the immediate cause of the increase of tension is an interference with the flow from the posterior to the anterior chamber, produced by a too close application of the lens to the posterior surface of the iris. He backs up his belief with approximately 94% of cures in 49 eyes, treated by producing a small hole in the root of the iris either by a peripheral iridectomy or preferably, and in the majority of cases, by a peripheral iridotomy.

In spite of the fact that the operation seems so simple (or perhaps on account of this) and the results so surprisingly good, the papers have hitherto met with practically no recognition; and this, in the present writer's opinion is largely due to the theoretic difficulties which at once arise in the mind, in attempting to reconcile Curran's theories and facts with what we have previously known or believed about glaucoma. These theoretic objections, which Curran does not take the trouble to explain away, seem so important, that in spite of the author's evident sincerity, I am bound to say that at first I took no particular stock in his procedure; and I find that this is the mental attitude of every one with

whom I have talked about it. It was only after seeing, in his clinic, the immediate and wonderful effects which Curran produced by simply cutting a little hole in the iris-root, that I became convinced of its importance.

Since November 15th, 1920, my colleague, Dr. Jas. M. Patton, and I have operated on 30 eyes, in 23 patients, by the Curran method and the results have been so satisfactory that I feel like endorsing Curran's claims without qualification. Twenty-two of these eyes were of the kind which Curran insists are the ones most certainly suited to the operation; that is, they were quiet, distinctly glaucomatous eyes, with tension ranging from 32 to 70 (Schiötz) in which the iris could be distinctly seen to be pushed forward to some extent by the lens. In 17 of these, an apparent cure was effected. That is, the tension dropped to below 23 and remained there with sight and fields as good or better than before the operation. In 4 of these the result was only moderate, the tension going down from 37, 47, 32 and 40 respectively, to 27 in all four. In each of these four eyes the hole in the iris root was very small. Better technic would undoubtedly have given better results. In one of the 22 the result in a practically blind eye was distinctly poor; tension dropping from 44 only to 35, the general condition becoming poorer than at first, on account of severe hemorrhage into the anterior chamber. In 8 eyes in which the iris was not pushed forward at all, the results of the puncture were practically negative or transitory; in 2 of these an Elliot trephining later produced a satisfactory result.

The length of time which has elapsed since the successful operations were

done is, of course, not great; but in the majority, at least 3 months have elapsed without any tendency to a recurrence of increased tension. I have had no experience with peripheral iridotomy in *acute glaucoma*, but Curran has tried it with good results in several acute cases.

OPERATIVE TECHNIC

Curran's description of the technic is literally as follows: "The knife [Knapp's knife needle] was passed thru at the corneo-scleral junction.

pate any difficulty in performing the operation. Practically, however, I find that while therapeutic results are fairly uniform it is very difficult to obtain the same uniformity in the operative results. It is by no means easy nor even possible in all cases, to cut thru the little bridge of iris picked up by the point of the knife; and I have had to be satisfied in a number of cases with two very small holes or even only one. Luckily, however, in the great majority of cases a minute hole seems to do as well as a large one. But this is not

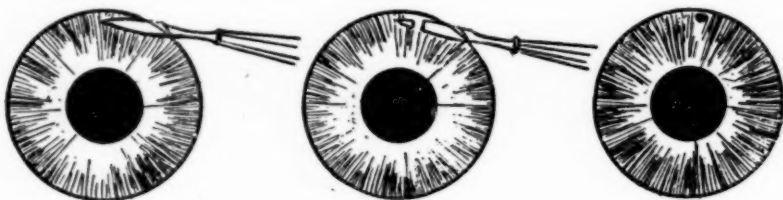


Fig. 1.

Fig. 2.

Fig. 3.

Curran's operation of iridotomy.

Fig. 1.—Knife needle entering anterior chamber at corneal margin.

Fig. 2.—Knife needle after puncture and counterpuncture of iris.

Fig. 3.—Hole in iris made by cutting out a fold on needle.

[Fig. 1]. The iris was engaged by the point of the knife, which on further pushing formed a little ruck in the iris, rendering the easy performance of the counterpuncture. The knife was pushed still farther with pressure directed upward, so as to cut the iris transversely, making a hole about 1 mm. in size. Sometimes it was necessary to almost make a counterpuncture in the cornea in order to sever the intervening piece of iris. At times it was found that the first puncture made a hole in the iris sufficiently large and the knife was withdrawn without a counterpuncture in the iris. In cases of long standing, in which there might be an occlusion of the canal of Schlemm, the knife was directed toward the ligamentum pectinatum of the opposite side so that some of these would be cut by the point of the knife with the hope that free drainage into the canal of Schlemm would thus take place."

From the brevity and simplicity of this description one would not antici-

always the case. Where the hole is very small a second operation is more apt to be required; and was required in 5 of the successful cases; and even where the tension remains normal, with a small hole the operator feels less assurance about letting the patient pass from observation, than if the hole is one that can be easily seen.

The reading of Curran's case reports makes it clear that he has met some of these difficulties, and I consider it unfortunate that he has given them so little attention. I believe, therefore, that a page from my own experience may be of use to others. In the first place I could see no reason, from Curran's description, why the bridge of iris should be severed by cutting up, rather than down; and on asking Curran about this his only explanation was that he thought there was less danger of injuring the lens if the cut were made upward. This reason did not seem good to me, so I tried in my first two cases, to cut down; but found that the iris was so elastic that the peri-

phery could be drawn clear down to the center without cutting thru the bridge.

As I could not see how cutting up with a play of only 1 mm. could possibly give a better chance of cutting the bridge, than cutting down with a play of several mm. my enthusiasm for the operation faded rapidly and might have disappeared entirely if it had not been for the suggestion of Dr. Patton, who, after a special trip to Curran's clinic, returned convinced that, generally, where Curran got a complete division of the iris bridge, he did so by pressing the latter against the corneal tissue with the edge of the knife. After this we succeeded in making the proper union of the puncture and counterpuncture in a fair proportion of cases, but by no means always. In his description it may be noted that Curran speaks of being obliged almost to make a counterpuncture in the cornea in order to cut the bridge. It was in thus making a deep counterpuncture that I got the only bad result in my series, on account of the severe hemorrhage above described (See also p. 894).

My impression now is that to be as sure as possible of an ideal result, one should have a Knapp knife needle (not a Ziegler), with a very sharp point and edge, with something of a belly and a blade not longer than 5 1/2 mm. If with this, after making the puncture and counterpuncture in the iris, one will press the blade upward firmly but very slowly against the cornea or sclero-corneal junction, the result is apt to be good. The needle should be introduced subconjunctivally and withdrawn slowly.

FIXATION AND ANESTHESIA. I find that fixation by the superior rectus tendon (if the cut is to be upward) is better than a fixation at any other one point. The ideal fixation would be a double one, by a lateral rectus tendon for the puncture and by a vertical tendon for the vertical movement of the knife. The objection to using double fixation is that it demands more liberal use of the anesthetic; and economy in this direc-

tion is of great importance, because the difficulty of the operation increases with the dilatation of the pupil. To avoid this it is important to give a drop of 1/2% eserine every minute or so, five times before and during the preparation; and to limit the use of cocaine to injecting 3-4 drops of 1% solution, 5/16 to 1/2 inch away from the corneal margin. In addition to this we use a drop of 2% alypin solution (as suggested by my assistant Dr. Nora Fairchild) applied four times to the conjunctiva and cornea before the four minutes thru which the cocaine injection is allowed to act. Where alypin can not be obtained, its place is best taken by a single drop of 2% cocaine followed by three drops of a 2% holocain solution. It is always well, as in a cataract operation, to have the patient come to the table with an empty stomach, so that a general anesthetic can be given if he prove to be unruly. A right handed operator naturally makes the hole in the left eye, above; on the right eye also, the hole can be made above, working across the nose bridge in most patients; but with a high bridge, unless the operator be thoroly ambidextrous, it is better for the right eye, to stand at the head and make the opening below. The reason for standing below, when the iris is to be cut above, is that this enables the operator to see the point of the knife when it passes up under the limbus. When a second iridotomy must be made on an eye, it should be made at the side opposite to the first hole. When any considerable congestion follows the operation, homatropin or even atropin should be used cautiously to prevent adhesions. As Curran insists, it is very important to get the opening as far as possible toward the periphery so that it will not be closed by coming into contact with the surface of the lens. This was well shown in one of my cases in which at the first operation a perfectly good hole was made in the iris, but it was at least 1 1/2 mm. from the periphery; and altho it reduced the tension from 40 to 27 the patient continued to have occasional spells of blurring such as she

had had before the operation. A second iridotomy made only a very minute hole in the iris, but it was well out in the periphery and the blurring has not recurred since it was made, and the tension has remained at about 22.

THEORETIC OBJECTIONS

The objections to Curran's theory and practice which most readily come to mind are these.

1st. If glaucoma is due to resistance to the current from the posterior to the anterior chambers, offered by an abnormal extent or firmness of contact between the iris and the lens, why does not *iris bombé* occur?

2nd. How shall we account for the tension reducing action of myotics, which must increase the extent and firmness of the lens-iris contact?

3rd. Why does not an iridectomy which, when the iris is torn loose at the root, gives the freest kind of communication between the chambers, produce as good results as the iridotomy?

In answer to 1, it may be said that we practically never see *iris bombé* except when the adhesions between the lens and iris are confined to a comparatively small circle near the center. Where there are peripheral adhesions, there is not enough slack left to permit bulging at the periphery. In chronic glaucoma, to be sure, there are no adhesions between the iris and the lens, but the latter is pushed forward by the increased pressure in the vitreous; and that the contact thus produced with the iris is firm enough to cause an overaccumulation behind the root of the latter, can be demonstrated to a certainty by the increased depth of the anterior chamber which can be seen to develop within half an hour, after a successful iridotomy with little or no loss of aqueous.

With regard to the action of myotics, which decrease the tension while increasing the iris-lens contact; I do not believe that this can be explained on the supposition of a direct filtration of aqueous thru the iris root, as Curran has suggested in a verbal communication. No sufficient proof has ever been offered that this takes place, and our

common experience with *iris bombé* argues strongly against it. It seems more rational to assume that while the myotic tends to raise the tension by increased iris-lens contact, this is more than overcome by its effect in freeing the entrance to Fontana's spaces.

The third objection is the most difficult to meet. A well performed iridectomy certainly opens up a free communication between the chambers; and in the light of Curran's work it seems probable that in the numerous cases in which it relieves tension without a filtering scar, this communication is what does the work. Why then, if Curran is right, is iridectomy so notoriously inefficient in chronic cases? And why should a simple peripheral iridotomy or peripheral iridectomy be so strikingly superior in its effects? It seems to me the answer to this objection is that while an iridectomy re-establishes the free communication between the chambers, this communication is too free to produce an essential part of the effect of an iridotomy, namely, the pushing back of the iris-lens system into its proper position, thus freeing the entrance to the spaces of Fontana. After an ordinary iridectomy, the fluid passes without resistance from the posterior to the anterior chamber; but the opening is so free that there is no tendency for the iris to be pushed back. When, on the contrary, a peripheral iridotomy or iridectomy is done, leaving the sphincter and the main portion of the iris intact, the fluid which passes forward thru the peripheral hole pushes the iris back to a depth corresponding to the inflow, until equilibrium is established.

Curran relates one case where after an unsuccessful ordinary iridectomy, he got a permanent reduction of tension by an iridotomy at the opposite side. To explain such a result on Curran's theory, one has to suppose that the space between the iris periphery and the zonula is not always continuous all the way around; and that this may be so is indicated by the occasional case in which a partial *iris bombé* occurs.

It will be noted that the results of a peripheral iridotomy in glaucoma offer the most convincing proof of the incorrectness of Hamburger's idea that there is, generally, a lack of communication between the posterior and anterior chambers, and that the passage of liquid forward from the posterior chamber if it occurs at all, is so insignificant as to be of no consequence.

If this explanation is correct, it shows, together with the favorable effects of miotics, that it is not merely the opening of the communication between the chambers that produces the good results which follow iridotomy, but that the opening of Fontana's spaces is also necessary for the best results. When a successful trephining has been done, the effect on the tension may in part be due to this action of the peripheral iridectomy. But so many trephined eyes remain soft in spite of a continued shallow chamber, it is evident that, with good scleral drainage, the reposition of the iris (i.e., the pushing back of iris and lens) is not essential.

Curran seeks to explain the pushing forward of the lens, in the majority of glaucoma cases, by the supposition that the aqueous secreted in the posterior chamber, meeting with the abnormal resistance to its passage into the anterior chamber, forces its way thru the zonula into the vitreous and thus tends to push the lens forward. This supposition appears to me to be erroneous. Since the normal flow is from the vitreous to the posterior chamber as I demonstrated in rabbits 30 years ago (*Arch. of Oph.* XXI, 179, 186), it seems much more likely that the first step in the process is the occurrence of rather sudden accesses of pressure in the vitreous, which push forward the lens, before the pressure can be equalized by passage of fluid thru the zonula. Then the resistance to passage thru the pupil offered by the increased iris-lens contact leads to the permanent increase of intraocular pressure.

COMMENT.

To grasp the force of the argument that lens-iris contact plays a large part

in many cases of glaucoma, the reader should bear in mind the incontrovertible fact that where a patient with chronic glaucoma and a shallow chamber has a hole of about 1 mm. in diameter made in the periphery of the iris, *with little or no loss of aqueous*, the chamber can plainly be seen to be deeper in the course of half an hour; and the tension, while it may not fall, or may even be higher for a few hours or longer, almost invariably falls to normal in the course of 24-48 hours. If, on the other hand, the chamber be not at all shallow before the operation, in quite a large proportion of cases the fall of tension either does not take place or it is not permanent.

It will naturally take a good deal more time to determine how permanent the results of peripheral iridotomy will be; but even if they do not hold out as well as those obtained by the Lagrange or Elliot operations, there is no doubt in my mind that Curran is amply justified in his claim that even if we could know that a case would eventually need a filtering operation, in some cases the iridotomy would be worth while to reduce the danger of the more serious operation; and where the patient has good sight, but a field limit close to the center, I believe the trial of the iridotomy should be mandatory. The same is true where a strong tendency to ocular hemorrhage has been observed either as the result of operations or by the presence of hemorrhages in the retina. I have had one case in which one eye with retinal hemorrhage was lost from intraocular hemorrhage, setting in several days after a perfectly faultless trephining, where only the direst necessity could compel me to open the other eye freely. In this case (and in a similar one of Dr. Patton's), the peripheral iridotomy has held the tension nearly down to normal; and it should, I believe, be repeated indefinitely if necessary, rather than risk the danger of scleral drainage.

The fact, demonstrated by Curran, that in many of these iridotomized eyes atropin can be used freely is another of the interesting things for which the

reader should consult his original papers but which this paper can not take time to discuss.

CONCLUSIONS.

(1) The results of peripheral iridotomy prove conclusively that in a large proportion of cases of chronic glaucoma; and probably of the acute form also, abnormal iris-lens contact plays an important part.

(2) Nearly all, if not all cases of chronic glaucoma with shallowing of the anterior chamber, can be relieved for many months and probably indefinitely, by making one or two holes about 1 mm. in diameter close to the root of the iris.

(3) The experience of Curran indicates that acute glaucoma, or exacerbations of the chronic form, can also be cured by the same operation.

(4) Where the chamber is deep, the effects of peripheral iridotomy are apt to be negative or not permanent.

(5) Even if the results of the puncture prove to be not permanent, it is so simple that it can be repeated often, with very little strain or danger; and as a preparation for more serious operations it is sure to have a place.

(6) If the favorable results of the operation prove to be permanent, peripheral iridotomy, or some modification acting on the same principle, is destined to displace ordinary iridectomy and the filtering operations from a large part of the field which they now occupy.

(7) The peripheral iridotomy, as proposed by Curran, while very simple and satisfactory in many cases, is by no means easy, nor even possible nor safe to perform in all cases. The substitution of some less simple but more reliable method of making a hole thru the iris periphery, may eventually turn out to be more practical.

[Since the above was written and read, I have had a second bad result from a peripheral iridotomy or an attempt at it. The patient, a woman with only one eye, seemed to be an ideal subject for the operation; but the counterpuncture in the iris could not be made without pushing the knife rather

deeply into the tissues at the angle of the chamber. A sharp hemorrhage into the chamber followed, with quite a severe congestive reaction. The tension was reduced from 32 to 25, but the pupil became adherent and the sight was much reduced. In this case the bridge of iris was not cut thru. I think it probable that the sight will improve considerably. But the case is a sharp reminder that it is not safe to say that the operation can do no harm. It also emphasizes the question whether some other method of making a hole in the iris root, less apparently simple, but capable of greater uniformity in results, may not with advantage be substituted for Curran's iridotomy.

Where everything goes according to schedule, this operation is the simplest and most satisfactory thing imaginable; the knife transfixes the fold of iris and on cutting up and a little forward against the cornea, a nice hole is made; but in other cases, for no apparent reason, the same knife needle will puncture the iris but will fail to make a counterpuncture; either entirely, or until the point is pushed so far up and across that one cannot see just what it is doing. My two bad results have occurred when, in cases of this sort, I have attempted to be sure of cutting thru. Unless Dr. Curran has some new light to cast, I feel like advising that where the counterpuncture in the iris is not readily and evidently made, it is best to give up the attempt to make it and to cut slowly and not deeply against the cornea after the simple puncture of the iris. Whether this procedure will prove to be safe and efficient remains to be seen. If not, it may well be that a puncture, counterpuncture and complete section of iris periphery and limbus with a very narrow cataract knife; or a return to the peripheral iridectomy which Curran tried in his earlier cases, will in the long run be better suited for general practice. The more I see of the operation, the more I am convinced that a knife with a *very sharp* point and edge is the most important factor in its successful performance.

THE PRESENT STATUS OF KERATOPLASTY.

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The different operations proposed for keratoplasty are here grouped into four types. These are described and a summary given of their results. A case is reported in which the suggestion of Kraupa of rotation of a trephined flap was used. A bibliography is appended. Read before the Wisconsin Surgical Association, May, 1921.

The removal of opaque or translucent corneal tissue, with its consequent impairment of vision and the substitution therefor of clear corneal tissue, has been attempted from time immemorial by ophthalmic operators, each with slight variations in technic. A detailed account of these various attempts, both clinical and experimental, would be most tiresome; and for a com-

smoothly as possible. To fill in the denuded area, a disc of equal size was trephined from an animal's eye (dog or rabbit) or from a human eye that was to be sacrificed for some other reason. But the disc, to be implanted, embraced the entire thickness of the cornea. It was laid in place in the denuded area, care being taken to see that



Fig. 1.—Von Hippel lamellar type of keratoplasty, showing position of implant seen in section and from the front.

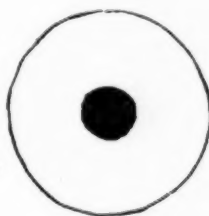
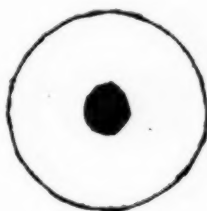


Fig. 2.—Von Hippel complete disc type of keratoplasty, replacing whole thickness of cornea.

plete bibliography of the subject, the reader is referred to Czermak, Elschnig and Wiener for communications up to 1909, and to Ascher and Walker for subsequent articles.

Of the different forms of operative technic, four types have yielded the highest percentage of good results:

I. The first type of operation was proposed by von Hippel in 1888, and up to as late as 1910 was the only keratoplasty that had yielded a permanent satisfactory result, altho a slight modification by Mühlbauer was equally successful. Von Hippel trephined an area of the opaque cornea some three to four millimeters in diameter to a depth of about half the thickness of the cornea. For this, he used the von Hippel trephine with a guard to prevent perforation. The disc, thus outlined, was then dissected out as

the epithelial side was uppermost. The lid was gently lifted into position and the eye filled with some sterile ointment and bandaged. Suturing the disc in place was distinctly contraindicated. A few satisfactory results were reported. But these were the exception rather than the rule, to a procedure that was tried very extensively, and eventually this method gave way to the second type.

II. The complete disc keratoplasty was also conceived by von Hippel and, to a great extent, has superseded the earlier operation. With the same trephine, a disc of, thru and thru corneal tissue is cut from the receiving eye, the guard being used merely to prevent too rapid a perforation with subsequent possible damage to the iris or lens. Absolute fixation of the eye ball is necessary, and the Elschnig bridle suture

thru the tendon of the superior rectus has proven useful for this purpose. If the iris is adherent to the posterior surface of the cornea, it must be dissected free. An identical disc is cut from the donating eye and gently laid into the aperture prepared for it. Here, too, great care must be exercised in preventing an inversion of the disc. No sutures are necessary, as the disc becomes fixed in place in a very few minutes by a plastic exudate. The eye is filled with a sterile ointment and the

increased vision or in length of time that the implant has remained clear. In eleven cases, the implanted disc sloughed out within a few weeks, and the aperture was filled in with scar tissue so that the patients were but little worse off than before operation. In the remainder of the cases, the implant became cloudy and the final vision showed no improvement. One eye was lost by panophthalmitis, and in several cases there was either a slight vitreous loss or a small iris prolapse that required excision. Blood matching of the donor and receptor did not increase the percentage of good results, nor did the original condition of either eye seem to have any marked influence upon the progress. In one case of a man of 29 years, the cornea was opaque from scars following a severe interstitial keratitis, and the vision of that eye corrected was but 2/60. A complete disc keratoplasty was performed. Nearly two years later, the disc was perfectly transparent and the corrected vision was 6/6 full.

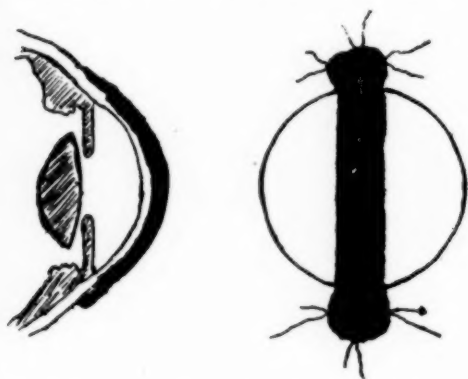


Fig. 3.—Loehlein ribbon lamellar type of keratoplasty. Stitches placed at each end of ribbon.

lids lifted gently into place. A firm binocular bandage is applied and allowed to remain for 48 hours, and then renewed every other day for two weeks. During this time, it is essential that the patient remain quietly in bed. It is of course unnecessary to add that absolute sterility of the conjunctival sacs of both donor and receptor must be assured by repeated cultures. The donor may be an animal, but better results follow the use of a homogeneous implant.

The earlier results of this method were not perfectly satisfactory, but perfection of the technic by Elschnig has improved the ultimate outcome. This author has recently reported fifty-four cases operated, with absolutely clear implants in seven cases. Nearly all of these cases were observed for upward of twelve months and some as high as six years. No other method has ever yielded results at all comparable with these, either in percentage of

III. In 1909, Löhlein published a partial keratoplasty, the technic of which he had perfected upon rabbits and which is a typical operation of the third class. A vertical ribbon, some three to four millimeters wide, is excised from the center of the cornea by means of a knife with two parallel rigid blades that distance apart. The depth of this strip is about half the thickness of the cornea; and at each end, a conjunctival flap in the form of a fan remains attached. One of the conjunctival flaps is raised with a blunt forceps and the cornea gently dissected free. A similar ribbon of cornea and adherent conjunctiva has been prepared from the eye of the donor and is immediately laid in the place of the excised corneal strip. Three sutures in each conjunctival fan serve to fix the graft in place and maintain it there until nutrition is established. A few favorable results have been reported, but far less than from operations of the second type. Of course, this type of operation is suitable only for superficial scars and here as well as in the other operations, absolute sterility of the tissues in-

volved must be assured by repeated cultures.

IV. The fourth successful type is represented by Wiener's denuding operation and is limited in its application to very superficial scars. An area, one third larger than the area of scar tissue, is outlined with a very sharp knife to a depth of about one half of the thickness of the cornea. One corner of this area is raised and grasped with forceps; and, with a fine pointed knife, the epithelium and superficial corneal tissue is peeled off, much as the skin of an onion is peeled off. A great deal of the success of the operation consists in remaining in the same corneal stratum thruout the peeling-process; and this is accomplished by blunt dissection along the white line that appears at the junction of the cornea that is already free with the cornea still in place. After the tissue has been removed, the eye is filled with sterile ointment and bandaged, and regeneration of the denuded area allowed to take place. If nutrition has not been too badly interfered with, the regenerating cornea should remain transparent.

Of course, innumerable other types of operation have been attempted, and individual successes have been reported by many of the originators of the technic. But no one of these various types have proven efficacious in the hands of other operators. Among these may be mentioned the total keratoplasty suggested by Burke but a few months ago, altho the same operation was described by Wagenmann as long ago as 1888. Walker proposed a modification of Löhlein's lamellar operation, altho this same type was abandoned by Elschnig, following several disquieting failures. Even more radical than all was Szimanowski, who proposed a transplantation of the entire cornea with adherent sclera and conjunctiva and in case of necessity, the entire iris.

CAUSES OF FAILURE.

The lack of success in any keratoplasty is due to: 1, suppuration; 2, failure of the implant to adhere, or 3, subsequent opacity of the implant.

In nearly all cases, suppuration may be avoided by scrupulous technic. As the operation is never an emergency operation, sterility of the conjunctival sac, with associated sterility of the cornea, may be assured by repeated cultures following the methods laid down by Elschnig and Ulbrich. In this connection, emphasis should be laid upon the unreliability of smears from the conjunctival sac where the organisms may be but few. A smear is usually made with a platinum loop

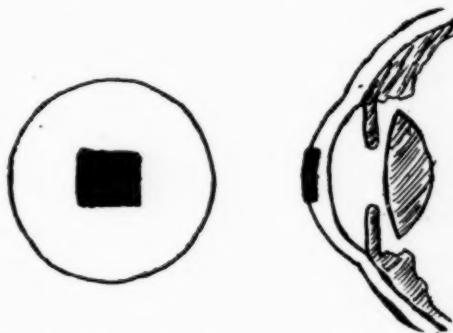


Fig. 4.—Wiener denuding type of keratoplasty shown from the front and in section.

which can gather merely the organisms on the surface with which it comes into contact, whereas a proper culture is made by flooding the conjunctival sac with fluid culture media, which is then taken up with a pipette and introduced into the culture tube. This method gathers the organisms that are lurking in the retrotarsal folds and shows the presence of organisms in about double the number of cases that a smear alone does. Under no circumstances should a keratoplasty be attempted until the conjunctival sac of the receptor at least, and preferably the donor as well, is assured free from contamination.

Failure of the implant to adhere dooms the ultimate success of the operation in a small number of cases, possibly 15%. The cause of such failure is not known, nor can it be foretold in advance. Ascher and Elschnig conducted an extensive series of experiments to determine whether a serologic cause could be found, but were not successful. Blood matching of donor and receptor gave no basis for

prognosis. An analysis of the causes of the corneal opacities removed, yielded nothing. Preservation of the graft to be implanted for minutes, hours, days, and even months (Magitot kept one graft for four months before utilizing it) seemed to have no influence upon the course of the case. All that can be said is that in a certain number of cases of all types of keratoplasty, the graft sloughs out, or rather fails to adhere, and is removed by the passage of the lids. This leaves an open area that slowly fills in with scar tissue, impermeable to useful light rays; and the patient is but little worse off than before the keratoplasty was attempted.

The implant may become opaque within twenty-four hours after the operation. This is due to swelling of the corneal stroma from the presence of aqueous that has gained admission to the implant by damage of the endothelium or by rough treatment of the implant itself, such as crushing with forceps, etc. If the trauma has not been too severe, such opacity clears to a certain extent and does not vitiate the value of the graft entirely. Secondly, the implant may become opaque within several days following the operation, due to the ingrowth of new vessels from the edges. Such new vessels are apt to be very fine and numerous and are surrounded by a definite zone of opaque tissue. Such opacity seldom disappears, but usually it is not so dense as to eliminate qualitative vision entirely, altho there is a marked reduction. The third type of opacity appears several weeks after operation and is permanent. It is probably due to failure of nutrition of the graft, owing to a walling off process that occurs in the cornea adjacent to the operated area. No serologic cause has ever been found for that process. Finally a fourth type of opacity may appear, years after the operation has been called a success. This is frequently in conjunction with an increased intra-ocular tension and usually results in the complete loss of qualitative vision.

In 1914, Kraupa made a purely theoretic suggestion for partial keratoplasty; but as far as can be ascertained,

the operation was never performed. This operation was suggested for a superficial opacity, lying in the pupillary area of the cornea, the periphery of the cornea being clear. It was suggested that with a large von Hippel trephine, an area of the cornea be outlined, excentric to the pupillary area of the cornea. This would bring the opacity near the periphery of the outlined disc, which was to be dissected free and rotated upon its own axis, so that the opacity would eventually lie without the pupillary area of the cornea and the former site of the opacity would be covered by the opposite periphery of the disc, containing clear cornea. The idea appeared so ingenious that I attempted the operation in the following case:

Mrs. G. S. Age 50. When first seen in 1918, corneal opacities were found which were supposed to have been present some four or five years. The right pupil was 2 mm. and the left 4 mm. and both immobile. She was receiving antispecific treatment at the time. Vision then, right 6/60 and left 6/22. This examination and record were made by the late Dr. M. Frank.

In October, 1919, each cornea showed a rather dense superficial opacity over the pupillary area, the right somewhat deeper than the left, but the left more extensive than the right. The right pupil was 2 mm. and the left 4 mm., both round and even, but immobile. The view of the fundi was impaired, but no pathology could be seen in the back-ground. The tension was normal. Wasserman was ++. Right vision was 0.2 ? and the left vision 0.3. The right vision could not be improved with glasses; the left was improved with a minus sphere and cylinder to 0.4. Under local anesthesia, a 6 mm. disc of the right cornea was outlined with the von Hippel trephine, excentric to the pupillary area of the cornea. It extended thru about one-third of the thickness of the entire cornea. With a spatula and a keratome, the disc was dissected free and rotated upon its own axis without being lifted from the corneal bed. After determining that the margins were in place the eye was

filled with yellow oxid ointment and tightly bandaged.

Eleven days later, the eye was completely free from signs of irritation and the disc was well healed in place. The outlines were clearly visible. The new pupillary area of the cornea was fairly clear but not entirely so, as there was some deeper opacity that had not been included in the disc.

Five months later, the entire disc was slightly hazy, but distinctly clearer than the original opacity. The outlines of the incision were still visible as a faint grey ring well under Bowman's membrane. The corrected vision was now 0.3 full.

One year and five months after the operation, the eye was pale and not irritable. With the naked eye, the location of the disc could be barely determined by the faint haziness of that portion of the cornea, but the outlines were no longer visible. The central opacity that lay below the disc was unchanged. Under the slit lamp, the opacity of the disc was found to lie immediately below Bowman's membrane and consisted of a diffuse lattice-like opacity or rather haziness of the corneal fibres. No new vessels could

be seen. The outlines of the disc could be determined indefinitely, but there was no sharp line of demarcation. The remainder of the cornea was normal. The pupil was contracted to one and a half millimeters and was rigid, precluding a clear view of the fundus. The corrected vision of the eye was 0.2 full. The left eye was unchanged except that the corrected vision had fallen to 0.3 full.

Theoretically, this operation must be considered as at least a partial success. The corneal transplant remained sufficiently clear to permit of qualitative vision, which is the point desired of such an operation. Unfortunately, not enough corneal depth was included in the trephined disc to embrace the total opacity, an error which can be eliminated in future operations by a proper depth estimation of the opacity by aid of the slit lamp. The failure to improve vision was due to two factors; the deeper opacity which has just been discussed; and a gradually advancing tabetic atrophy of the optic nerve. But the operation was sufficiently successful to warrant the use of this technic in other and more favorable cases.

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MATURE AND IMMATURE SENILE CATARACT.

LT.-COL. HENRY SMITH; C. I. E., I. M. S.

AMRITSAR, INDIA.

The following address, delivered before the Chicago Ophthalmological Society, May 26, 1921, gives some history of intracapsular extraction. It compares the intracapsular with the capsulotomy method both as to technic and results.

I propose to speak to you on the relative merits of the two leading methods of dealing with senile cataract, mature and immature. This, I presume, we all regard as the great issue of today in ophthalmology. That it is a burning issue is clear from the vehemence that is displayed in the ophthalmologic press. Quotations are oftentimes gathered from men who have little or no practical experience with this intensely practical subject, even tho they have written books and have honored names in other departments; and on the strength of such quotations is used such language as "extraction of cataract in the capsule under conditions existent in a civilized country is utterly inexcusable." "The capsulotomy schools do not all use quite as strong language as this. Another writer lays down the dictum on this subject that the literature on a matter of this kind is always favorable to anything new. Does any one really hold that the intracapsular operation has been received in this way? Does any one hold that Listerism was received with open arms when it was new? Does any one hold that Litholapaxy when introduced by Freyer and Keegan using the instrument devised by your own great citizen surgeon (Bigelow) was received favorably by the genito-urinary surgeons of the world? No! These and all similar innovations on time honored practice have been received with the utmost hostility.

The capsulotomy operation of today is practically where Daviel left it. Details have come into existence and gone out of existence with all the frequency and ease which befall philosophic theories. All the same, Daviel's operation is substantially the capsulotomy operation of to-day. A new detail does not make a new operation. We are told that Daviel's operation has

held the field since 1745. Its advocates should state that, while it came into existence in 1745, it was not practiced to any extent until Joseph Lister had established his case, and that extraction by capsulotomy in a general sense commenced to supplant lens couching only in the early eighties. The late Sir Jonathan Hutchinson, (who founded Moorfields in London), told me that they would never have departed from couching in London, but for the fact that the vision (following couching) rapidly failed, and finally vanished. He was the first man I have come across, who was aware that progressive atrophy of the retina invariably followed the best results of lens couching (night blindness). It was Listerism and cocaine which gave the great impetus to the extraction of cataract.

The younger members of the profession have to be reminded that the capsulotomy operation, as we know it, has been extensively practiced only for the past forty years. You will thus see that of these two rival operations the capsulotomy operation is not so very much older than the intracapsular as we do it in India to-day, which dates from the nineties of the last century.

The capsulotomy operation had however a good start as soon as it was practiced extensively, as it had been taught and had been before the professional mind from 1745 as a desideratum. The intracapsular method, since I commenced to advocate it and to teach it, is hardly twenty years old. I do not claim to be the first man to do intracapsular extractions. McNamara, in Calcutta, and Pagenstecher extracted cataract in the capsule by lifting it out on a spoon. I think the first to extract cataract in the capsule by expression, in a limited proportion of

cases, was an American, Dr. J. W. Wright, of Ohio, who published a paper in 1884. Shortly after this Malrony did practically the same operation on almost all his cases. It is a pity that Wright's work did not attract more attention even in his own country. Malrony did a vast amount of excellent work, but did not write at all; and thus his experience is lost to the ophthalmologic world. I have never seen him operate. Neither McNamara's nor Pagenstecher's method appealed to me. Wright was unknown to me. Malrony's results I had seen but not his methods. I also saw that patients could on occasion squeeze out the lens in capsule successfully themselves. The results of the patients' efforts were excellent. I proceeded to imitate the accident and evolved what I have done independently of any one. This method may yet be only in its infancy but it promises to be a hardy youth.

We are told that we are received unduly favorably. This is not so. When I read my first paper, at the British Medical Association meeting, in 1903, on an experience of 6,000 cases, I was received with icy coldness. I was at the head of a list for a paper before the British Medical Association, in 1908. There were 6 or 7 unimportant papers to follow. At the commencement of the sitting the President said, "I shall reverse the orders of the papers," which left my paper to be taken as read. This was surely not unduly friendly to say the least! However, I have not always been treated with such scanty courtesy.

Dr. Herman Knapp is a name which you all revere; his results are frequently put forward with the implication that intracapsular extraction could not give better results. It may surprise American ophthalmologists to hear that, after he read the paper I brought before the British Medical Association meeting in 1903, previously alluded to, he wrote to me:—"If you can devise a method to extract cataract in the capsule you will be a greater benefactor to mankind than Daviel. If I were not over 70 years of age and in delicate health I would go round the world to

see how to do it." This was the first word of encouragement that I received from ophthalmologists and that letter is the foundation of the welcome I have given to American ophthalmologists in Jullunder and Amritsar.

I will now put before you, in a general way, the advantages and disadvantages of these two rival operations. Intracapsular extraction is only within the range of men who have had high class technical training in the art. It is a difficult operation. The capsulotomy operation is a relatively easy and simple one. Intracapsular operation requires a skilled assistant. The same amount of skill is not required on the part of the assistant in the capsulotomy operation.

Any incision, if large enough for intracapsular extraction, and any flap, will do equally well in either operation, according to the preference of the operator. Similarly, an iridectomy or no iridectomy may be done. The intracapsular procedure can be done with equal ease at any stage of maturity. In the capsulotomy operation the cataract should be mature.

After cataract follows the capsulotomy operation and requires to be operated upon. There is no after cataract following an intracapsular operation. Iritis is a frequent complication after capsulotomy but is practically absent after the intracapsular operation. Vision is better after intracapsular than after capsulotomy. Vitreous escape, in skilled hands, is about the same in both operations. Sepsis more frequently follows the capsulotomy operation, often due to tags of capsule left in the wound.

Two disadvantages of the intracapsular operation are (1) a somewhat larger proportion of prolapse of iris in the noniridectomy cases, and (2) a slightly drawn up pupil in the iridectomy cases. Choroidal detachment is equally common to both.

IRITIS. Before I raised this issue in 1903, it was the generally accepted view that iritis following cataract extraction was due to the bruising of the iris in the process of extraction. I stated that chapter would have to be rewrit-

ten, as iritis did not follow in one in 500 cases in extraction of the lens in capsule, thru an entire pupil which had not been acted on by a mydriatic; tho there must of necessity be much more bruising of the iris in the latter case than in the capsulotomy operation. Iritis, therefore, is caused by the lens matter and capsule left behind in the capsulotomy operation, as I have often previously laid down. This view has, since that date, been accepted but no credit has been given to intracapsular extraction for demonstrating this fact. I now go further and say that it is caused more by capsule left behind than by lens matter. This is evidenced by the fact that when the capsule bursts, in the intracapsular extraction, if we are able to extract the capsule and yet leave a little lens matter behind (as is often the case), iritis does not follow, but if the lens capsule is left behind iritis frequently does follow.

Since intracapsular extraction came prominently into the field our opponents of the capsulotomy school tend to make little of iritis, both of its frequency and of its consequences. In my observation it is more frequent than many of the papers published would lead us to believe. It is not an unimportant complication. I consider iritis a serious complication, causing the iris to be cemented to the after cataract and the pupil often to be occluded with a dense membrane, if no more sinister consequences happen. I have seen any number of such cases operated by most experienced operators in India, such patients being told that nothing more can be done for them. If you gentlemen who operate by the capsulotomy method do not often come across such cases you are highly to be complimented. Time does not permit me to deal with the treatment of after cataract of this nature.

AFTER CATARACT is a subject for a whole sitting in itself. If you refer to the journals of the past you will observe that before the year 1903 the treatment of after cataract was the evergreen of ophthalmologic meetings. Before that date the treatment

was regarded as serious, from the point of view of the patient, as the extraction of the cataract itself. Mr. Richard Cross opened a discussion on this subject at the British Medical Association meeting, in 1901, in which he laid down that the ideal extraction of cataracts was in the capsule, but that that was not possible and this was tacitly admitted by the meeting. So much for the significance of the after cataract at that time. Since 1903, if you look up the discussions on after cataract you will notice the change that has come about. It has hardly appeared as a full dress subject at any meeting. You would infer that today it is a trifling, unimportant proceeding associated with no sinister results.

When we consider that Listerism applied then as it does now and that the same instruments and methods were used then as now, the position seems inexplicable. In my observation just as severe forms of after cataract occur now as did then and as severe results are associated with the needling of them. The removal of a portion of the anterior capsule having become more fashionable than it was then, may render the after cataract a little less dense in the case of mature cataracts; but when we recognize the fact that since intracapsular extraction came into the field for any stage of immaturity, the policy of extracting by capsulotomy of immature cataract has also come into the field, with the result that in these cases the after cataract must be dense and must be dealt with; in my opinion dense after cataract is as frequent as ever it was.

This view is supported by the fact that in the United States you have advocates who laud the introduction of needling an immature cataract, so as to cause it to mature in a day or two. This fact is evidence that it is recognized that a dense after cataract follows the same process in America that it does in India. To my mind this method only needs to be mentioned to be condemned. Such a proceeding deliberately produces a traumatic cataract. Who has ever seen a traumatic cataract in a patient without a violent

iritis? I have not and I have seen many of them. I go further and say that these are the most difficult of all cataracts to deal with. If we decide to extract the immature cataract we must put our courage together and extract it in the capsule.

THE INCISION. One of the objections raised against intracapsular extraction is that the incision is of necessity too large, not exceeding 180° . This conclusion would imply that it interferes with the nutrition of the cornea, causes an objectionable amount of astigmatism or is followed by a greater percentage of septic cases than the smaller incision used in the capsulotomy operation.

With my enormous experience I can state that not one of these premises is based on fact. Those who advance these conclusions do not advance a single fact to support their premises. They say—this must follow or that must follow—but “this” and “that” do not follow when examined by hard facts. Our opponents say that we cannot do intracapsular extraction with a conjunctival flap. This is nonsense, we can do it with any flap or any incision provided it is large enough. Much is made, by the way, of the powerful nutritional influence of conjunctival flaps. I saw a dexterous operator do intracapsular extraction thru a Czermak's incision. He subconjunctively cut two-thirds or more of the sclero-cornea with scissors. I saw a number of such cases several days after operation. They demonstrated that the nutrition of the cornea does not depend on the conjunctiva, as every case had extensive patches of starvation opacities which would never recover. These starvation patches do not follow when the incision does not exceed 180° of the sclero-cornea without a conjunctival flap. It is thus evident to me that the nutrition of the cornea for practical purposes is not thru the conjunctiva.

IRIDECTOMY. It is also advanced against intracapsular extraction that we cannot do this operation without an iridectomy. This is not so; we can do it thru an entire pupil uninfluenced by

a mydriatic, just as well as with an iridectomy. We can go further; we can do it well in cases in which the iris is tied down to the lens by iritic adhesions. In this latter case if you extract by the capsulotomy method you will have violent iritis and its consequences in every or almost every case. You will thus see that our limitations are less than those of our opponents.

VITREOUS ESCAPE. This is the great issue. Our opponents would seem to have much less of this evil than formerly was the case, but on the basis of large series of figures, reaching back into the nineties of the last century, they have to admit 7 per cent. incidence of this complication. A skilled operator by the intracapsular method should not have more. In intracapsular extraction with control of the eyelids as we do it, when vitreous escapes it would be of small amount. In my observation escape of under a third is not followed by sinister consequences. I think the capsulotomy operators will admit that when they have escape of vitreous it is considerable in amount, as they do not control the pressure of the eyelids as we do.

The consequences of escape of vitreous in these two operations are quite different. In the intracapsular we do not fear iritis or irido-cyclitis as a consequence. Our opponents have to admit then when vitreous escapes they have at once to close down leaving the capsule and a considerable amount of lens matter in the eye and that under such circumstances they have frequently a severe irido-cyclitis. Our opponents say that when vitreous escapes it is not renewed. How do they know? Why make such a statement in an off-hand way when it is based on the absence of knowledge. The physiology and pathology of the eye are hardly in their infancy. We must admit that from birth to mature size the vitreous body has grown. This implies a physiologic mechanism thru which it has grown. The statement that vitreous is not renewed after escape implies that that mechanism has ceased to exist when the vitreous has reached mature size. How do they know? They do not

know. I saw not long ago a horse breaker who had both lenses extracted in capsule fifteen years ago. In each eye there had been considerable escape. I examined him. His vision in each eye was better than 6/6, and there was no sign of degeneration. How does the above assertion fit in with such a result. The reverse could far more plausibly be held.

THE PUPIL. In noniridectomy cases, the pupil is as central in one operation as the other. In the case of iridectomy the pupil is more central in the old operation than in the intracapsular, and occasionally much more so. If you use a mydriatic in the old operation, afterwards, you will observe that the pillars of your coloboma are practically always tied down to the after cataract by adhesions tho it may be comparatively free elsewhere. This is the cause of the keyhole pupil. The entire pupil contracts on the center, the iridectomy pupil (if there are no adhesions as in the intracapsular cases) contracts on the point of attachment of the iris to the ciliary region. This mechanically straightens out the key hole into the shape of a U and of necessity draws up more or less the lower part of the pupil.

My ambition is to be able to do without iridectomy entirely. I hope to be able to accomplish this object by finding some drug or some method which will paralyze the orbicularis muscle for five or six days after operation. It is the contractions of the orbicularis which are the cause of the prolapse of the iris. I hope other workers will devote thought and energy to this issue, which I consider one of the most important on cataract extraction as it stands today. Among other things it will eliminate the necessity of an assistant.

DRESSINGS. It is advanced against us that we do not dress and inspect our cases often enough. We must remember that this is one of the most major operations of surgery. Iritis we do not have. The only complications are sepsis, choroidal hemorrhage and prolapse of iris. In my observation sepsis and choroidal hemorrhage defy treatment;

besides such cases give indications and naturally are inspected. Prolapse of iris may give no indication and is much better left alone for ten or twelve days, as interfering with it earlier may cause the patient to burst open the whole wound and has no other advantage. Why should we reverse the canons of surgery by dressing and inspecting wounds daily? By doing so we are depriving the affected area of surgical rest. Such daily dressings are meddling surgery.

THE ASSISTANT. We are accused of requiring a skilled assistant. What general surgeon would listen to such an argument. We are also told that to be a perfect operation it must be such that any ophthalmic surgeon can do it as well as any other. Does the general surgeon say that Dr. Cushing's procedure of dealing with a diseased hypophysis is bad because very few will attempt it? Does the general surgeon say that excision of the Gasserian ganglion is bad because very few will attempt it? Still, I hope that the day is not far distant when intracapsular extraction will be considerably simplified.

BARRAQUER'S OPERATION. I recently visited Dr. Barraquer in Barcelona. He received me with the whole-hearted kindness and courtesy of a Spanish gentleman. Dr. Fuchs, Senior was with him. He operated on a few cases before us with his *crisiphake*. It acted beautifully. He insisted that I should operate also to show him how I did the operation in India. Mine came out as easily and as perfectly as his, and in both cases with the minimum of violence. We three were agreed that in the hands of the two experts there was nothing to choose between them. Dr. Barraquer's instruments may not require as highly a skilled assistant as my method. On the other hand, it is a highly complicated apparatus with plenty of possibilities of going wrong at a critical moment, in the hands of a man who has not thoroly mastered its mechanism and whose fingers have not grown to act automatically.

The instrument requires a technic of its own. Those who have mastered

my technic, I am confident, will have no difficulty in using it as a good deal of the technic is common to the two methods. They are complementary to one another. The erisiphake is but in its infancy, and we have yet to see if it will master certain classes of cases as well as the older intracapsular method, but in most cases I have no doubt it will act beautifully and be a simpler method to acquire skill in. I was immensely pleased to meet Dr. Barraquer, a whole-hearted believer in intracapsular extraction and to see him use his instruments. It has in my opinion come to stay and will help to make matters move on. I congratulate Dr. Barraquer on all the energy and zeal which he has devoted to making this method perfect. When Hulen's instrument came out, I tried to get one as the method appealed to me. Thru-out the war we could get nothing of the kind done in England.

CHARACTER OF PATIENTS. It has been repeatedly advanced that what will succeed in Indians—an uncivilized people—will not succeed among nor satisfy a civilized people such as the white races. Those who write thus seem to be unaware that Indians belong to the Ayran race, to which we also belong; and that they were a highly civilized race long before Europeans were. You have only to read Hindu and Buddhistic philosophy to find this out. As regards the whole range of surgery, the people of India measure your worth by results, as much as the people of Europe or America do. It is on this basis that litholapaxy supplanted lithotomy in the last two decades of the last century. It is on this basis that intracapsular extraction of cataract has got the upper hand over the capsulotomy method in India. To assume that you can cut or hack about Indians in any way you please and that they will recover shows gross ignorance. As a matter of fact they are not as good subjects for operation as Europeans. Their vegetarian diet I presume is the cause. This is the best defined in the operations subject to surgical shock. It is not uncommon in the West to see an operator spend one and a half to two, or even

three hours on an intraabdominal operation and for the patient to recover as a matter of course. In an Indian if you expect a similar operation to be successful you must not spend over an hour on it and if you do it in half an hour your death rate will not be nearly so large. The principle herein involved is the same all down the line, cataract included. The Indian has not anything like the same recuperative power as the European.

CONCLUSIONS. It is often advanced by implication that my facts are worthless because I am overworked, and that by men who are not aware that cataract is but a part of my work. I had once a distinguished member of the profession on a visit; when leaving he told me that he wondered how I got thru the work, but he now understood. He said, "you are not overworked, you are not hustled; it is your organization that is the explanation; every one about you has got his job and knows it, and has got to do it leaving what you want to yourself." After thirty years on the plains of India I do not look like a man who has been overworked.

As regards my facts, I have satisfied myself, I have published statistics of cases selected before operation which should satisfy the most fastidious. To publish the details of between 40,000 and 50,000 cases would make up a volume in itself, which I presume no one would read. Those who have visited my clinic have seen everything, there was nothing concealed from them.

As regards the status of intracapsular extraction of today, views expressed in papers of the West are misleading and take too narrow a view of the outlook. It is a yellow peril. I think I am not overstating the case when I say that close on 25,000 cataracts a year are done by the intracapsular methods in India, and that ten years hence we may have to add another ten thousand. Thus India will have a voice in the decision. This method has come to live and dominate its opponent in the whole East, and in my opinion will come to be the operation the world over twenty years hence.

UVEITIS WITH DENSE VITREOUS OPACITIES; PARTIAL RECOVERY.

ROBERT H. BUCK, M.D.

CHICAGO, ILLINOIS

In the case here reported vision was reduced to perception of hand movements for a year. But ultimately recovered in both eyes to eight-tenths. Read before the Colorado Congress, July 29, 1921.

While the literature of uveitis is so extensive as to discourage further additions, the case I desire to report has some features in which it does not conform definitely to any particular type, and it belongs to a group to which comparatively scant consideration has been given. This is due in part to the relative rarity of this type of cases and in part to the difficulty of observation and treatment in these cases because of the tender age of the patients usually affected, a handicap to which I was not subjected as my patient was an adult. I refer to the non-suppurative type of metastatic ophthalmia occurring as a sequel of acute and chronic infectious diseases.

The very voluminous literature on the subject of uveitis to be found in the textbooks, in various works on pathology of the eye, in the American Encyclopedia of Ophthalmology, in exhaustive treatises and in two excellent symposia, one presented before the Ophthalmologic Section of the American Medical Association in June 1902, the other before the Ophthalmological Section of the International Medical Congress in London in 1913, deals extensively with the ordinary forms, i. e. the ectogenous and the pyogenic types of endogenous infections of the uveal tract, the prognosis of which if the vitreous has been invaded, is extremely grave; and also with those forms of nonsuppurating uveitis due to the specific venereal diseases and tuberculosis. As a consequence there is more or less overshadowing of the nonsuppurating type due to infectious diseases in children, the prognosis of which should be made guardedly and the treatment persisted in over an extended period.

Axenfeld in his *Pathology of the Eye*, and Fuchs in his *Text-book of*

Ophthalmology, consider the condition under the heading of Metastatic Ophthalmia. Parsons treats of it as a form of exudative choroiditis, and Wilder devotes a paragraph to the subject in his contribution to the American Medical Association symposium above mentioned.

While these cases are clinically and anatomically true types of uveitis, they differ materially in their pathologic manifestations from the type due to infection by pyogenic germs.

According to Fuchs, "they are without doubt also due to endogenous infection by bacteria, and in part perhaps to the action of the toxins which are formed in the body. In any case the inflammations thus produced are not so violent and destructive as those due to infection by the pyogenic organisms. The exudation develops more gradually and remains more confined to the tissue itself. The tissue is infiltrated chiefly with uninuclear leucocytes, which tend to accumulate about the blood vessels under the form of scattered foci. Thus along with the diffuse infiltration there are formed nodular exudates which in the ordinary traumatic inflammations are only exceptionally met with. In correspondence with the nonsuppurative character of the inflammation is its outcome, which is also less serious. Panophthalmitis never results and even atrophy of the eyeball is a comparatively rare sequel, occurring only in particularly severe or in often recurring cases."

The vitreous chamber sometimes fills with a dense exudate of a grayish color which may be seen pressed up against the posterior surface of the lens and almost completely obscuring the fundus reflex. In some cases the exudate remains subretinal, resulting in a condition known as pseudoglioma

for which the eye is frequently enucleated.

The case I am about to report is one of metastatic ophthalmia following mumps, and my reasons for making this report are:

First; Because of the comparative rarity of this disturbance in an adult.

Second; Because of the very gratifying results obtained by long continued persistent treatment in spite of the discouraging outlook, and

Third; To lay stress on the comparatively favorable prognosis in this type of cases by a case in point.

A previous experience with a case of recurrent retinal hemorrhages which was reported in the *AMERICAN JOURNAL OF OPHTHALMOLOGY* for October 1919 gave me much experience and encouragement in the treatment of this one. In the case to which I refer the patient who had lost the vision in one eye within two months in a previous attack, retained 8/10 vision in the remaining eye in spite of repeated attacks of hemorrhages and the condition has now become quiescent. For the past two years he has been employed as a drug salesman calling on the trade, doing the necessary reading of small print in a price-list and all the clerical work his occupation entails.

CASE REPORT. Mr. C. E., age 23, single, farmer, American birth, German descent. Family history negative both as to communicable systemic diseases and ocular disturbances. Had no serious illnesses previous to the present trouble and denied having had any form of venereal disease.

In 1917 he enlisted in the army and in March 1918 while in camp, he developed a severe attack of mumps which was complicated by orchitis of the right testicle, necessitating hospitalization for a period of two months.

In June 1918 his right eye became inflamed and vision began to fail but there was little pain or lacrimation and no photophobia. This disturbance progressed in spite of treatment until in September the vision was reduced to hand movements. He stated that his teeth were x-rayed and several blood Wassermann tests made, all of

which were negative. General physical examination threw no light on the etiology. The inflammation subsided, but vision did not return.

In February he was discharged from the army and while on his way home, without premonitory symptoms of ocular disturbance, vision in the left eye began to fail. The eye was evidently suffused with blood for he stated that all he was able to see was of a bright red color. This phenomenon was not accompanied by pain. The red color disappeared but his vision was so reduced that he was able merely to see shadows.

For a time he received no treatment, then on July 29th, 1919 he entered a U. S. Public Health Hospital. The hospital records showed that he was under treatment for uveitis and that various tests had been made to determine the etiology. His tonsils were removed. He was examined by three eminent oculists none of whom offered him any encouragement.

I first saw him on September 9, 1919. Examination. O. D. V. Shadows. O. S. V. Fingers at one foot in lower temporal quadrant of field. About 15° of divergence. Right pupil 5 mm., left 7 mm., both round, react to light. Right eye. Fair light projection. Conjunctiva slightly injected and chemotic. Cornea perfectly clear. Anterior chamber moderately deep, aqueous clear. Upon dilatation with cocaine, the lens clear and transparent with a few small spots of iris pigment adherent to anterior surface. Mass of vitreous opacities pressed close against posterior surface. Eye not painful but slightly tender over ciliary region. Tension normal. Ophthalmoscope revealed dense opacity occupying entire vitreous with fundus reflex a mere line around the periphery. By focal illumination these opacities were of a grayish color. Visual field absolutely blank.

Left eye. The findings on oblique examination were practically the same as those in the right eye. With the ophthalmoscope a small area of the fundus could be seen in the upper nasal quadrant. The visual field com-

prised merely a small peripheral segment of the lower temporal quadrant.

The Wassermann, both blood and spinal fluid tests, and the cutaneous tuberculin test were negative.

Examination of the nose and accessory sinuses and throat revealed no pathology. General physical examination failed to uncover any etiologic factors.

TREATMENT. Locally atropin and dionin and hot applications were ordered. He was given subconjunctival injections of salt solution. Internally he was given increasing doses of potassium iodid. Mercury was administered by inunction and he was given pilocarpin sweats and hot packs. This treatment was persisted in for several months.

December 3, 1919. O. D. V. Shadows. O. S. V. 1/10 thru the lower temporal quadrant. Right eye. Slight broadening of the fundus reflex sufficient to reveal a patch of choroidal atrophy or an organized white mass near the periphery on the temporal side. Field still blank. Left eye. Opacity seemed less dense with a peripheral visual field, broader in the lower temporal quadrant. Tension normal in both eyes.

The dosage of potassium iodid had now reached 180 grains a day and he was beginning to show signs of lowered vitality, hence the drug was discontinued for a period of two weeks and begun again at five grains t.i.d. Baths and sweats were also given less frequently. Local treatment was continued with dionin alternated with yellow oxid ointment every three days. Mercury rubs had been used only at intervals for some time. Subconjunctival injections were changed to cyanid of mercury, given weekly alternately in each eye.

January 30, 1920. O. D. V. Fingers at one foot in the temporal side of the field. O. S. V. 3/10 thru the lower temporal quadrant. Right eye. 15° divergence. Opacity less dense and further broadening of fundus reflex. Spot of choroidal atrophy on temporal side. Left eye. Marked improvement, central scotoma smaller.

March 26, 1920. O. D. V. Fingers at one foot in temporal side of field. O. S. V. 5/10 thru lower temporal quadrant. He was now able to read large type, such as headlines in a paper, at 15 cm.

June 11, 1920. O. D. V. Fingers at one foot, as before. O. S. V. 6/10 central vision. Jaeger 5 at 15 cm. Right eye diverges at 15°. Large central opacity surrounded by clear area, large opacities deep in vitreous.

Left eye likewise central opacity but less dense and fundus can be plainly seen all around periphery. Tension normal in both eyes. Large central scotoma in both fields. Treatment continued as last outlined.

July 21, 1920. Condition slightly improved and he was permitted to go to work. He had useful vision in the left eye only, but with this he was able to read typewriting.

December 3, 1920. Vision again failed and he was compelled to discontinue work. Cloudy vitreous, opacities in both eyes. Former treatment again resorted to.

January 13, 1921. O. D. V. 6/10. O. S. V. 6/10. Right eye. Note marked improvement in vision. Ophthalmoscope revealed a general red reflex, tho vitreous opacities were still very dense and freely movable. No fundus details could be seen and patch of choroidal atrophy was no longer visible. Left eye. Much loose grayish-white material moving about in the vitreous so that fundus was obscured altho there was a fair red reflex. Tension normal in both eyes. Fields of both eyes were clear in peripheral portion with relative scotomata surrounding the blind spot in each eye. Divergence was still 15° and he now complained of diplopia.

July 19, 1921. O. D. V. 8/10. J.3 at 15 cm. O. V. S. 8/10. J.3 at 15 cm. Pupils dilated with homatropin. Retinoscopy O. D. + 1 vertical + 1.50 horizontal. O. S. Could not get shadow.

At trial case vision was more clear with O. D. + 0.50c axis 90. O. S. + 0.50c axis 75.

Tension normal. There was 20° divergence of the right eye, the left being the fixing eye. Fields were full sized but there was a considerable relative scotoma enlarging the blind spot temporally. Color fields were normal.

Ophthalmoscope. Right eye. Revealed a dense white mass occupying the center of the vitreous (retinitis proliferans), the remainder of the vitreous containing many large and

small opacities. The region of the macula was fairly distinct and portions of retinal vessels could be distinctly seen in various portions of the field. The disc was completely obscured as was also the patch of choroidal atrophy referred to.

Left eye. Many large and small vitreous opacities but no definitely organized mass. No fundus details discernible.

THE SPECIFIC PRECIPITIN REACTION OF THE LENS.

LUDVIG HEKTOEN, M.D.

CHICAGO, ILLINOIS.

This paper sets forth the facts regarding the specific reaction of the higher vertebrates to crystalline lens substance. This is essentially the same whatever the species from which the lens is obtained. Read before the Chicago Ophthalmological Society, May 26, 1921.

It was discovered by Uhlenhuth that the lens of different species gives the same immune reactions. A lens antiserum, produced let us say by injecting a rabbit or guinea-pig with beef lens, will react in precipitation, anaphylaxis and complement fixation tests not only with beef lens but also with the lens of other mammals, of birds, and of amphibians. With fish lens the reaction, however, is very faint. The specificity of the reaction is determined not by species, as in other immune reactions (blood, serum, bacteria), but by the organ from which the antigen is derived as illustrated by this scheme:

	Lens Antiserum	Serum Antiserum
Lens (homologous)	+	O
Lens (heterologous) ...	+	O
Serum (homologous) ..	O	+
Serum (heterologous) ..	O	O

So far the lens is the only clean cut example we have of this organ-specificity as contrasted with species-specificity in antigen-antibody reactions.

I have studied the precipitins that develop in rabbits on the injection of lens solutions in 0.9% salt solution; approximately 10 or 20% solutions by weight of beef, horse, rabbit, sheep and swine lens, removed with special care to avoid admixture with blood or serum, have been used. As a rule four

or five injections of lens solution are given intravenously at four day intervals, first 2-4 c.c., increasing gradually to 12-16 c.c. The highest titer of the serum is reached about the eighth day after the last injection. Most of my work has been with antisera that would cause precipitates in lens dilutions of at least 1 to 5000 and often much higher. The injection of rabbits with solutions of rabbit lens, however, does not have the same antigenic effect as the injection of lens of other species, and as contradictory results are reported on this point, further study is required.

Table 1 shows that all the lens solutions used (beef, chicken, dog, guinea-pig, horse, human, monkey, rabbit, rat, sheep, swine) react in the same way with beef lens antisera; further that this antiserum does not react with the serum of beef blood or of the other species represented and conversely that beef serum antiserum does not react with any lens solution. The organ-specificity of the lens holds good thruout and the lens does not appear to contain any species-specific antigens. Horse, sheep, and swine lens antisera have precisely the same effects as beef lens antiserum.

The aqueous and vitreous humors contain lens substance because these fluids in low dilutions or full strength react with lens antisera. These hu-

mors react with serum antiserum also—not always—and then the law of species-specificity obtains. The presence of lens substance in the humors is interesting and the question arises whether the lens substance in the humors is derived from the lens or on the way to be incorporated into the lens.

Table 1 also shows that the serum of a rabbit injected with extract of beef cornea reacts with beef serum, beef vitreous, and beef aqueous, but not at all with beef lens or any other lens, indicating that the cornea contains species-specific proteins only.

We see then that the precipitin reactions of the lens of certain mammals are lens-specific and that the lens does not appear to contain any species-specific precipitinogens, hence the lens protein may be regarded as chemically distinct and as identical in diverse species.

Note—The precipitation in sheep vitreous horse and sheep serums by beef serum antiserum and beef cornea antiserum are examples of species-specific reactions extending over to related species.

	Beef Lens Antiserum	Beef Serum Antiserum	Beef Cornea Antiserum
Beef Lens	+	0	0
Chicken Lens	+	0	0
Dog Lens	+	0	0
G. Pig Lens	+	0	0
Horse Lens	+	0	0
Human Lens	+	0	0
Monkey Lens	+	0	0
Rabbit Lens	+	0	0
Rat Lens	+	0	0
Sheep Lens	+	0	0
Swine Lens	+	0	0
Beef Aqueous	+	+	+
Dog Aqueous	+	0	0
Human Aqueous	+	0	0
Rab't Aqueous	+	0	0
Sheep Aqueous	+	0	0
Swine Aqueous	+	0	0
Beef Vitreous	+	+	+
Dog Vitreous	+	0	0
Human Vitreous	+	0	0
Rab't Vitreous	+	0	0
Rat Vitreous	+	0	0
Sheep Vitreous	+	+	+
Swine Vitreous	+	0	0
Beef Serum	0	+	+
Horse Serum	0	+	+
Human Serum	0	0	0
Monkey Serum	0	0	0
Rab't Serum	0	0	0
Sheep Serum	0	+	+
Swine Serum	0	0	0
Beef Cornea	0	+	+

CATARACT OPERATIONS IN THE AGED.

SAMUEL G. HIGGINS, B.S., M.D.

MILWAUKEE, WISCONSIN

The special forms of cataract that occur in the aged and the time when extraction is indicated are mentioned. The bearings of pathologic conditions, local and general, upon operation are discussed. Practical hints are given for overcoming the special difficulties of dealing with unreasonable patients and those lacking selfcontrol. Read before the Wisconsin Surgical Association, May, 1921.

To say when a person is old is indeed a matter of relativity. I look upon persons of 80 years or over as aged. My observations for the most part are on the old men in the National Soldiers Home in Milwaukee who exhibit the usual forms of cataract; degenerative hypermature Morgagnian cataracts are rare.

In case the cataract has lost its mother-of-pearl grayness when viewed by oblique illumination and is distinctly milky, I approach the operation with much timidity. Preliminary iridectomy prepares the eye for less hazardous irrigation of the anterior chamber. When the amber brown nucleus is visible, an attempt to remove as much of the lens as possible is made before irrigation is employed. The capsule forceps seems to me to be followed by quicker release of the hard nucleus than when the cystitome is used.

When the lens is mature, light perception prompt, and the eye healthy with full anterior chamber, clear sclera and cornea, and tension right, any cataract technic may be selected. This provides of course that the patient's general fitness and demeanor are correspondingly favorable.

As I recall the run of patients, more than half of the number present themselves while the vision is failing and when the cataracts are immature. It is at this stage that the distant and near vision (with glasses) are carefully recorded and the fundus under mydriasis. In this connection I feel that a much better study of the fundus, as well as of the lens, can be made when the pupil is widely dilated. Euphthalmin is the favored drug. Cocain dilates the old pupils slowly; one disk of homatropin and cocain, each 1/50 grain, is satisfactory and has not

been observed to be followed by any increased intraocular tension.

Preliminary iridectomy has become my practice in immature cataracts. Other things being equal the eye with poorer vision is operated first. Gentle massage applied directly to the lens with the flat iris replacer is quite routinely done, tho the effect of this proceeding is extremely variable. A second massage of this kind is occasionally repeated using the edge of the spatula. Puncture of the anterior capsule with the cystome, avoiding an incised line, is very effective. Extraction is attempted when the details of the fundus cannot be seen anywhere thru the lens even tho there are areas showing some red reflex.

Next in importance to the form of cataract present is the health of the eye. I do not view a cataractous eye as tho it were a healthy eye. To operate an eye that does not respond to light is useless; this condition is paramount contraindication to cataract operation. Light perception to colored lights adds more cheer to the prognosis. I have seen little difference in the result whether the eye is myopic or hyperopic, tho the great majority of the cataract patients have shown me hyperopic distance glasses.

Scars upon the cornea may influence the location of an iridectomy or determine the advisability of simple extraction without iridectomy. Results of iritis being frequently present, or of ulceration of the cornea, a wide dilation of the iris even under atropin will locate fine synechia either anterior or posterior. If the adhesions appear to be firm or extensive a Ziegler knife or similar needle knife, will sever the adhesions which operation can later be followed by preliminary iridectomy.

Do these old eyes and old people tolerate these repeated operations? A difference of opinion is justifiable, but it is in my opinion that these eyes do better this way than when subjected to the complete cataract extraction at one sitting.

There is a consensus of opinion that the extraction of a cataract when the eye is in an attack of glaucoma is a very hazardous undertaking. In a less degree is there danger in the presence of chronic glaucoma. Attempts at wide glaucoma iridectomy, or even freeing of adhesions, may excite acute glaucoma with rapid sustained intraocular tension—such tension that the optic nerve is markedly damaged. The non-operative treatment of glaucoma had best be given a thoro trial. Relief of tension by sclerotomy followed by preliminary iridectomy, or the severing of an adhesion, may be attempted previous to the cataract operation.

Diseases of the eyelids should receive careful attention. Ectropion, of which there are many cases in the Soldiers' Home, and entropion should be previously operated. Old scars from trachoma need not contraindicate cataract operation, if one is sure that no acute process is present, or that rough areas on the lids do not harbor other microorganisms. I look with suspicion upon all follicles of the conjunctiva, granular or thickened areas, or small swellings near the lid margins. Such areas should be treated for weeks if necessary, cauterized, actually burned away or excised and the conjunctiva made germ free before a cataract operation. Chalazia are sometimes very persistent in old people. Thoro incision and curetting of these lumps seems warranted. Redness and congestion about the roots of the eye lashes in old people means more than blepharitis marginalis with eye strain. Such red lid edges may be evidence of the bad habit of rubbing the eyes with soiled handkerchiefs or fingers.

Dacryocystitis is the condition I most dread. Thoro treatment should be undertaken and completed even to the point of extirpation of the infected lacrimal sac as long as mucopurulent

secretion, or mucus, can be squeezed from the tear duct. Ligature closing of the canaliculi is recommended by many writers.

Beyond correction of the pathology of the globe itself and of the adnexa, I believe that the less you disturb these old people the better. One would not think of operating during the time of an acute suppurative sinusitis as he would not in the presence of an acute laryngitis, tonsillitis or bronchitis. But what can you do when the patient has had for years pus in the nose from old ethmoidal sinusitis? Perhaps suture the tear duct. If I should insist that all dirty teeth, necrosed and pyorrheic, of my cataract patients be extracted I fear that I would be doing but few cataract operations. However I do not like to see these filthy mouths, and I do recommend cleansing and extractions when favored with intelligent co-operation.

Disturbing bronchitis with cough, asthmatic tendencies, indigestion with belching or flatulence, and constipation or diarrhea require appropriate and palliative treatment. Inevitable arteriosclerosis, valvular heart disease, chronic nephritis and glycosuria do not contraindicate cataract operations.

Having learned of the presence of sugar in the urine, a few weeks attention to this condition may be of some value, but this is doubtful in very old patients. Better to ascertain the probability of acute exacerbations and effects of other operative precedures than to worry the patient and yourself over possible complications. The history of eclampsia or uremic disease in women may warrant protracted treatment of chronic nephritis or albuminuria. Fisher, in reporting delirium following eye operation refers to Casey Wood's admonition: "In every case the condition of the bladder, plevis, urine and blood should receive attention." The attention that can be given an old person is relief from active inflammation or distress, and after that you proceed with the operation.

Delirium is very rare after cataract operations in the Soldiers Home. I attribute this to the fact that the pa-

tient is not prepared for delirium. He sees other patients whose cataracts have been removed, he visits with them, knows that they go their way unattended and use the newspapers. After the operation he is placed in the ward with other patients and no one seems unduly anxious over his recovery. He is instructed as to his conduct in this new experience; but he is talked to as an intelligent person who is expected to cooperate with the surgeon and the hospital attendants.

The risk of delirium or acute psychosis is in my opinion inherent with the patient. One may word his observations as Edward Jackson did on this subject: "The obscure nutritive failure that produces senile cataract, is closely allied to the obscure nutritive deterioration that predisposes to insanity. One may suspect that such a predisposition may be lurking in a large proportion of patients suffering from senile cataract." Two fairly recent patients afford illustrations. One woman was operated in a private sanatorium. She refused to speak to me or reply to any question put by me during the operation. The special nurse was permitted to attend to the technical arrangements for the operation but the patient's personal requests were transmitted thru her usual nurse. The vision following the operation with glasses was 20/20 her manner toward me during the refraction was sullen and resentful. Another woman of most courteous and affable manner refused to keep her fingers from the dressing or remain quiet in bed following preliminary iridectomy. Even in my presence the evening of the operation she persisted in touching the bandage, always with some childish excuse. This woman had been in the sanatorium on two previous occasions. To complete the operation might place her in the sanatorium again. As long as her vision permits her to walk about without assistance I believe it better judgment to defer the cataract operation.

If I have implied that delirium and acute psychosis may be suggested by the surgeon I should state positively that a nervous operator will excite ac-

tions on the part of the patient. The moment of the cataract operation is no time to reform the patient or break an 80 years stubborn disposition. Preparation for cooperation comes before the actual operation. If it is discovered as late as the completion of the anesthesia that the patient is unreasonable I would rather do an iridectomy and wait on the extraction than risk the operation. If the patient is upset, due to the presence of an excited relative, or has taken a personal dislike to the assistant, nurse or myself I feel that the result will be better to await subsidence of such idiosyncrasies.

Rather than bump the patient in and out of the hospital elevator I prefer to operate the patient in his own bed. For this purpose the ordinary hospital bed with two mattresses and the patient's head at the foot of the bed is satisfactory. The height of the bed can be raised by placing a brick or similar block under each leg of the bed. At the Soldiers' Home the bed is prepared in the surgical ward and screened off from the other patients; a private room is used in other hospitals.

It is greatly to be desired that one experienced nurse be in charge of preparation and all technical arrangements for cataract operations and be always assigned to this service in private hospitals. A nurse in training may be palmed off in the tonsil room, or even for mastoid surgery, but not for cataract operations. A detail of sometimes vital importance so often emphasized when I was assisting Casey Wood is the care and inspection of drugs and droppers and irrigating solutions. The solution used to irrigate the anterior chamber should not only be sterile but always free from lint or long cotton fibers. An older nurse or one with inherent tact and adaptability is the choice for special nurse after the operation. Vail reports that Colonel Smith prefers that his patients be attended by their native relatives. I feel that the surgeons had best select the one or two trusty relatives, and suggest that the patient know that they are present or within call and all

other interested relatives or friends be excluded.

I do not disturb the dressing or inspect the eye before the third, fourth or fifth day. If there is no complaint let the eye heal; if pain or uneasiness arise inspect sooner. On completion of the toilet of the operation a drop of 20% argyrol is placed over the incision, a line of bichlorid of mercury (1/3000) ointment is squeezed from the tube between the lid margins of

both eyes, eye pads of cotton or gauze applied, and both eyes bandaged. If delirium threatens, the bandage may be removed soon from the unoperated eye. Adhesives on the lids to prevent winking, eye shields and masks have all been gradually dispensed with, as no accidents have been experienced suggesting their utility. Postoperative cathartic is not given before the fourth day and then an active cathartic such as magnesium sulphat.

EYE COMPLICATIONS OF THE DISEASES OF CHILDHOOD.

H. C. PEABODY, M.D.

WEBSTER, S. D.

The more common lesions of the eye occurring with the acute infections of childhood are here described. A case of blindness permanent in one eye arising in whooping cough is reported. Abstract of paper read before the Sioux Valley Eye and Ear Academy, July 12, 1921.

While eye complications in the diseases of childhood are not exceedingly common in occurrence, it is important that they should be recognized early, the warnings that they bring taken heed of and the proper treatment for them instituted. It will be possible for me to mention only the most prominent instances of ocular involvement and I will classify them under their respective headings. The diseases considered in this paper with reference to their eye complications are scarlet fever, measles, diphtheria, whooping cough and mumps.

Some variety of conjunctivitis is a common accompaniment of all these diseases, with the exception of scarlet fever. It is surprising that the conjunctiva does not more often take part in the inflammation in scarlet fever, when we realize how common it is for the middle ear to become involved, with the added fact that the mucous membranes of the nose and throat are invariably involved. I have found that it is not enough to tell the nurse to keep the eyes washed out with boric solution, but we must instruct her carefully just how to irrigate and cleanse the eye properly, and how to instil a bland ointment in order to prevent the adherence of the lids and the sub-

sequent danger of injury to the cornea, when the lids are forcibly opened.

SCARLET FEVER. Albuminuria accompanies nearly all cases of scarlet fever. The most severe renal complication is that designated as postscarletinal nephritis (a diffuse nephritis), usually developing during the 3rd or 4th week of the disease and following the mild as well as the severe cases. An albuminuric retinitis, or a uremic amaurosis, very suddenly developing, may occur. The retinitis, in itself, presents a good prognosis, owing to the youth of the patient; and like the renal affection of pregnancy, it occurs often with a benign kidney lesion.

Optic atrophy in proportion to the retinal destruction may be expected. In differentiating the retinitis from the uremic amaurosis, we find in the blindness resulting from the uremia, that the pupil still reacts to light, showing that the affection cannot be in the eye or optic nerve but must be higher up as a result of poisoning; also, in uremia, the blindness is sudden and complete, and the ophthalmic findings are negative. Optic neuritis, orbital cellulitis, purulent choroiditis, and ulcus serpens are very rare complications of scarlet fever.

MEASLES. As is well known, this

disease, in the first stages preceding the eruption, is characterized by catarrhal symptoms of the nasal mucosa, photophobia, epiphora and a hyperemic conjunctivitis which generally disappears after two or three weeks without bad results.

In order to overcome the photophobia, these children develop a marked blepharospasm which later increases the conjunctivitis so that a vicious circle is established. Only in exceptional cases does the conjunctivitis become blennorrhoeal. It is in these cases that the cornea is endangered. In poorly nourished children, a chronic condition is often the end result. In addition to the routine treatment already suggested, Holt brings out a fine point in protecting the sensitive eyes of the patient, e.g., that the bed should be screened, but not to exclude the sunlight from the sick room.

DIPHTHERIA. In this disease, eye symptoms play a very important part. The widespread effects seen in diphtheria are due to the action of the toxins, which the bacillus produces during growth on mucous membrane. We may have a severe diphtheritic involvement of the eyelids and conjunctiva, as all mucous membranes are subject to the disease process. Fortunately tho, the condition is rare and is probably due to accidental infection rather than to extension thru the lacrimal duct. Before the advent of antitoxin, this almost invariably resulted in destruction of the eye. In the more severe true diphtheritic form, the cornea rarely escapes. If the entire area of the conjunctiva is infiltrated and rigid, the cornea is irretrievably lost. The prognosis, therefore, in the severe cases is very serious as regards the eye.

The most interesting and the most common eye complications in diphtheria are the paralyses which develop, usually making their appearance during the latter part of the disease or often weeks later. It may follow cases so mild that a diagnosis of diphtheria was never made. Rose reports in 171 collected cases of diphtheria that the eyes were involved in 77 of the cases,

in 54 of which the muscles of accommodation were involved. Rolleston reports 477 cases with ciliary muscle involvement in 236, or 53%, and extraocular muscle involvement in 80, or 18%. Diplopia in the extrinsic paralysis and inability to read in the intrinsic cases are the most common complaints. The prognosis for these cases is as a rule very good.

MUMPS. Edema of the lids may occur. Conjunctivitis as well as chemosis of the conjunctiva, the latter due to compression of the vessels of the neck, occurs. The lacrimal gland may participate in the involvement. Optic neuritis, iritis and ocular paralysis have occasionally occurred. In a number of instances, permanent blindness results, Woodward collected twenty three cases of optic neuritis and neuroretinitis.

WHOOPIING COUGH. Conjunctivitis and epiphora are common in the prodromal stage. Photophobia and mydriasis may indicate the transition from the catarrhal to the convulsive stage. The extensive hemorrhages which, owing to the violent coughing, may be subconjunctival or even orbital are important. In the latter case, they may be so severe as to cause a proptosis. Cerebral hemorrhages may give rise to complications. Hemorrhages into the meninges are far more common than those into the brain itself.

CASE. C. J. Age 4. Sex, male. Personal and family history, negative. First week of January, 1921, he came down with whooping cough. Spasms of coughing very hard and frequent. During the first part of March, the coughing spells had begun to subside in frequency, but their severity remained about the same. About March 23rd, the child developed a bronchial pneumonia. The first eye symptoms noticed by the parents were on the 26th, during the time the child was having convulsions. The father states that the eyes appeared glassy, and the child kept his eyes closed all the time. My assistant saw the patient on the 28th of March. Both eyes were closed, marked photophobia, moderate swelling of the lids, both eyes protruding,

both pupils markedly dilated, neither reacted to light. Both eyes rotated out and upward. No meningeal manifestations elicited. Within a week the movement of left eye was normal, with vision returning gradually reacting more and more to light, right eye remaining the same. Within a day or two after this I first saw the case. Examination disclosed the following: Right pupil completely dilated, no reaction to light. An exotropia of about 15° , combined with a hypertropia of about 10° , present. Fundus was negative. Unable to determine any vision whatever. Left eye: Vision for small objects. Pupil reacting to light. Fundus examination showed a small hemorrhage just above the disc.

The parents were instructed to bring the child into the office for further examination as soon as he had sufficiently convalesced. It was not, until the 28th of June, that I saw the case again, the child having had three or four

relapses. Right eye still turned out and up, but only about 5° . There was no reaction to light with the good eye closed, altho the child slightly jerked when I threw the light into the eye. Light cast in left eye caused both pupils to contract. No limitation to eye movements in either eye. Right fundus examination, possibly a slight pallor of the disc. The small hemorrhage had disappeared from the left. Ears, nose and throat, sinuses and teeth, as well as physical examination, were negative.

It will not be out of place in this connection to mention some of the eye complications or sequelae which are not necessarily of the diseases of childhood mentioned. In the cachexia following severe cases, we may have infiltrative as well as suppurative involvements of the cornea which at times have led to the loss of the eye by panophthalmitis. Fortunately this is rare.

NOTES, CASES AND INSTRUMENTS

THE USE OF IODIN IN CORNEAL ULCERTION.

DR. HARRY W. WOODRUFF

JOLIET, ILLINOIS

The communication of Dr. Harold Gifford on the use of tinctur of iodin in herpetic corneal ulceration (see Amer. Jour. Ophth., Aug. 1921, p. 604) prompts me to write of a similar solution of iodin and of a method of application which adds greatly to its effectiveness. My attention was called to the following solution in an article in the Journal Amer. Med. Assn. by Dr. Talbot, a Chicago dentist, several years ago.

Zinc Iodid	15
Iodin (Cryst)	25
Glycerin	50
Distilled Water.....	10

This solution is not as fluid as the tinctur of iodin and also does not evaporate rapidly. The position of the patient when making the application is also important. If the patient is recumbent or in such a posture that the ulcer is pointing straight upward the thick concentrated iodin solution will more readily remain in the furrow caused by the ulceration. This may be allowed to remain for several minutes and more may even be applied with less danger of the healthy corneal tissue being affected. Naturally this treatment is also of value in the deeper forms of ulceration, as the concentration of the solution and its longer application increases its effectiveness many times.

PANOPHTHALMITIS FOLLOWING PERFORATION OF THE GLOBE BY A PIECE OF BURST BUTTON.

W. GORDON M. BYERS, M. D.,

MONTREAL, QUEBEC.

Ruth L., aged 13, was brought to me with the statement that her eye had been "cut" five days previously, while playing "buzz-saw," that is, the common game of causing a button to revolve rapidly in opposite directions by

alternately tightening and relaxing a loop of string threaded through the button.

The clinical picture was that of a well established panophthalmitis. Infection had obviously taken place thru a large gaping wound, which lay just outside of, and closely paralleled, the upper-inner fifth of the cornea. The opening was filled with uveal tissue, and the pupillary area, irregular from the prolapse of iris, was occupied by grayish-yellow exudation. There was a faint red reflex only from the fundus. V. = p.l.; but the projection was faulty to the left and up and down. T. slightly reduced.

An enucleation was done; and at the moment of severing the optic nerve, half of a "Mother-of-Pearl" button, about three quarters of an inch in diameter, with a thinned edge, was expelled from the wound. The substance of the button seemed more porous and friable than usual. It had apparently been made from a poor piece of shell, or from shell of an inferior type.

Injuries to the eye from the game of "buzz-saw" have apparently not heretofore been reported; but this case shows, unfortunately, that it is liable at times to be followed by serious consequences.

CARE OF THE EYE FOLLOWING REMOVAL OF SMALL FOREIGN BODIES FROM THE CORNEA.

WM. C. BANE, M.D.

DENVER.

Read before the Colorado Congress, July 29, 1921.

Those of us caring for the eyes of railway employees and mechanics in machine shops have from time to time under our care a goodly number of eye cases having small foreign bodies in the cornea. The most troublesome cases to me have been those who have received first aid by a local surgeon or by a fellow-workman who has endeavored to remove the foreign body.

The foreign bodies are mostly de-

posits of emery; some of hot cinders, and occasionally small bits of metal. Those with metal of any size are, as a rule, sent to us at once without treatment other than a protecting cover. The first treatment consists of removal of the foreign body under local anesthesia by sterile spud or spear pointed instrument.

The best illumination and magnification obtainable should be made use of. My object in presenting this subject is to emphasize the importance of the after dressing and care to obtain the most rapid healing and minimum scar.

There was a time when, after removal of the foreign bodies, (a cinder or bit of emery), I dismissed the patient without any protection to the eye, and seldom was any after attention required. An occasional patient came for after attention, owing to slow healing or ulceration from infection.

In recent years I have had impressed upon me the importance of sealing the eye for 24 or more hours after the removal of the foreign body. There are three reasons for such a measure. First, the corneal tissue normally does not have any blood vessels, but receives its nourishment by imbibition, second, the closing of the eye prevents the admittance of infection thru the dust coming in contact with an open wound, and third, movement of the lid causes discomfort which is minimized by a compress bandage.

Immediately after removal of the foreign body, I apply some sterile vaseline in the palpebral aperture, then a small triangular pad of gauze with cotton between its layers, and adhesive strips retain the pad on the closed eyelids. (Method of covering the eye demonstrated). The patient is advised to leave the pad undisturbed for 24 hours and to return for further attention if the eye is not comfortable. Otherwise the pad can be removed. If a second visit is made fluorescein is used to determine whether or not the healing is complete. As a rule the corneal wound is found healed. It is surprising how rapidly nature will fill the gap and cover it with epithelium. After a corneal abrasion with loss of considerable of the epithelial layer,

upon sealing the eye it is surprising how rapidly the destroyed epithelium is reformed.

A patient with denuded area comes complaining of the eye being painful. After cleansing under local anesthesia and the application of a simple ointment and sealing of the eye, the pain ceases.

Subsequent to furnishing the topic for this paper, I read with special interest a paper by Dr. J. Ellis Jennings on "Removal of Foreign Bodies From the Cornea and Treatment to Prevent Ulceration." (Mo. State Med. Ass'n. v. 16, p. 263, Aug. 1919.)

I most heartily approve of Dr. Jennings' conclusions in which he advocates thoro removal of the foreign body and the application of a protecting bandage for 24 to 48 hours.

FOLLICULAR CONJUNCTIVITIS OR TRACHOMA?

J. R. FERRELL, M.D.

WACO, TEXAS.

Read before the Colorado Congress, July, 1921.

I have chosen this subject because of the controversies that have arisen out of surveys made by the U. S. Public Health Service of the Public Schools, especially in the South. In some of these surveys nearly every case of follicular conjunctivitis, folliculosis or vernal conjunctivitis, has been pronounced trachoma.

It would be a sad condition of affairs if their findings had all been correct. As a matter of fact, in my examinations of our Public Schools for the past six years, I have found less than one-half of one per cent of the school children have trachoma. We are treating this subject from the standpoint of a clinical inspection without going into the laboratory or microscopic findings.

We find many cases of folliculosis where we have no history of the child having suffered any inconvenience from the condition.

In follicular conjunctivitis we find the same small pinkish follicles, or the follicles may stand out in great rolls, with the addition of an inflammation

and some small amount of secretion. This condition is seen mostly in young children.

Vernal catarrhal conjunctivitis more nearly resembles trachoma, but the peculiar bluish appearance of the conjunctiva without the distinctly enlarged capillary vessels, the peculiar white, frothy, sticky secretion, the violent itching of the lids, and the distinct acute attack in spring and the much more tolerable condition in winter, make up the picture for vernal conjunctivitis.

We divide trachoma into three stages; the follicular, the papillary or hyperplastic, and the cicatricial or connective tissue stage.

Among our school children, we have to do almost entirely with the follicular stage of the disease. Occasionally we see one in the papillary stage. It is unusual to find a case of trachoma in young children, but I have seen a few cases as young as six years, where there were adult cases in the family.

The onset sometimes is very insidious, without any distinct inflammatory process. We find the distinctive, grayish white, semitransparent bodies, that have been called sago-grain granulations. They may be disseminated or in rows. They are mostly confined to the palpebral conjunctiva and the upper retrotarsal fold.

The mucous membrane, that contains the trachoma bodies which fill up the tissues, is pale or yellowish red. Later, as the inflammatory stage progresses with an occasional exacerbation, we find additional discharge that sticks the edges of the lids together. After this stage has been reached, there is no controversy about the diagnosis.

PANOPHTHALMITIS OF ENDOGENOUS ORIGIN.

F. S. COOK, M.D.

EAU CLAIRE, WISCONSIN.

Mrs. S., referred to me August 19, 1920, complaining of severe pain in right eye of two days duration.

Past history: Had been perfectly healthy up to four days ago, when she had a slight headache, increasing in

severity, and localizing in the right eye in the morning of the second day. Began menstruating at this time. The pain in the eye, towards night of the second day, became severe and she put "musterole" on the forehead and eye lids at this time. Pain increased in severity and a doctor was called, who gave her morphin, also used eserine in the eye as he could detect an increased tension. Next day, lids were swollen and eyeball was very hard, pain severe and no vision. I saw her the first time at noon on the third day.

The eye presented the following condition: Lids swollen, conjunctiva injected, movements limited, some exophthalmos, cornea flat, striated and opaque. Infiltration was in the deep layers of the cornea. Tension 60 mm. (Gradle Tonometer). Temperature 102, nose normal, no pus, no evidence of ethmoid disease. X-ray report shows frontal, ethmoid, sphenoid and antra clear. No apical abscess. General examination by an internist reported negative, urine negative, blood count, red cells 4,500,000, whites 9000, H. B. 85%. Smears from the eye show micrococcus catarrhalis. She was put in the hospital, eserine gr. 1 to the oz., 1 drop in the eye every hour. Hot packs, 20 minute every hour and mag. sulp., morphin to control pain. Next day, Aug. 20th, pain was still severe in spite of morphin. There was marked swelling of the lids and exophthalmos was more marked, eye almost stony hard. There were marked lines of pressure on cornea. Eserine was discontinued and hot mag. sulp. stupes put on the eye. At this time the eye seemed to be rushed down and out. White count was 15,000. Deep incisions were made in the orbit under nitrous oxid. No pus could be located. Canthotomy was done. Patient put in a restless day, temperature 102 6/10°. By night cornea was sloughing. The question of enucleation vs. evisceration was discussed pro and con and enucleation decided on for the reason we had not been able to locate any pus in the orbit and felt reasonably sure it was there.

Operation was performed August 21st, five days after first symptom.

Right eye enucleated, tissue very edematous. On incision of Tenon's capsule, a few drops of pus were found at the outer angle. The eye ball was ruptured in two places in freeing adhesions, vitreous escaped. Vitreous fluid, cloudy and looked like pus. Cornea was completely ulcerated. Palpation of orbit, after eye ball was removed, did not disclose any localized pus or thickening of periostium over ethmoid region. Guttapercha drain was put in center, Conjunctiva sutured. Convalescence was uneventful. Temperature dropped to normal on second day after the operation and continued so. On the second day patient complained of pain in the right shoulder, no redness or swelling. This disappeared on the fourth day with no other treatment than heat. Discharged in two weeks.

*Pathologic Report by Dr. King,
Pathologist.*

Gross Specimen: Cornea hazy, ulcerated, ciliary body covered with fibrinous exudate. Retina greatly thickened and thrown in ridges. Section shows cornea denuded of epithelium. Entire thickness shows massive invasion of polymorphonuclear leucocytes. The ciliary body is thickly sprinkled with polys and red blood cells. The ciliary muscle shows invasion. The ciliary processes are embedded in an exudate of fibrin and polys. The retina shows the same exudate and masses of polys are seen in the choroid and sclera. Hyperemia marked thruout. Bacteriologic findings of exudate. Many chains of streptococci. Diagnosis: Suppurative Panophthalmitis.

Comments

Here is a case of panophthalmitis of endogenous origin, coming on in a strong, healthy woman, without any apparent foci of infection. The only disturbance was her menstrual period. Could the embolus come from the distended venous sinus of the uterus? We are told this uterus is the most productive place of emboli. The early stages presented the typical picture of acute fulminating glaucoma. The increased pressure, no doubt, was due to the swelling of the orbital tissue press-

ing on the back of the eyeball and the eyeball being held back by the lids, muscles, etc. There was no pus in orbit and no rupture of the globe previous to operation. What was the cause of the cellulitis? Our classics tell us that we get cellulitis in panophthalmitis of endogenous origin, but it is late and after a rupture of the globe has taken place.

Fuchs's tell us that Tenon's capsule may be implicated in inflammation of the eyeball, so that the inflammatory edema develops in the capsule itself and in the adjoining cellular tissue of the orbit, and that the eyeball is thus pushed forward. Hence a slight degree of exophthalmus is sometimes found in severe cases of irido-cyclitis and in panophthalmitis. Could this be due to the secondary invasion of the Tenon's capsule thru the ciliary veins of the globe?

Ball says that inflammation of the choroid by metastases fortunately is of rare occurrence. It has been found during cerebro-spinal meningitis, typhoid fever, scarlet fever, puerperal fever, erysipelas, mumps, caries of the cranial bones, ulcerating endocarditis, septice-mia following surgical operations and compound fractures, and in the course of pneumonia due to influenza. The existence of purulent choroiditis as a metastatic affection was established by Virchow in 1856. Both eyes are usually affected, one after the other. Bull, of New York, who has carefully studied six cases occurring in the course of grippe-pneumonia, and has made two autopsies, states that the microorganisms found in such cases are the staphylococcus albus and aureus, the streptococcus pyogenes, and the pneumococcus. Postpartum metastatic choroiditis usually appears between the sixth and fourteenth days after delivery and is more frequently unilateral than bilateral. It is a sign of the gravest import. Of sixty-three cases collected by Axenfeld, twenty-two were bilateral. Prognosis as to life, in unilateral cases is good; on bilateral, usually fatal. Of nine cases observed by Hirschberg, all died. Recoveries however, have been recorded by Kipp and Wood. Kipp's case was unilateral, and Wood's was bilateral.

Hansell in the *Annals of Ophthalmology* of 1912, reports a case coming on during the course of acute inflammatory rheumatism. The patient died at the end of the third day. Cultures from the blood showed streptococci, but none could be found in the eyeball.

Graefe and Saemisch make the statement that it is not always possible to find a localized source of pus; and in such

cases, one must assume that the bacteria have entered the body thru a mucous membrane without having excited evident inflammation.

Axenfeld tells us that metastatic ophthalmia is due primarily to the introduction of septic masses into the capillary vessels of the eye. In the binocular form, the first tissue to be infected is the retina; in the monocular, the uvea.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

COLLEGE OF PHYSICIANS OF PHILADELPHIA, SECTION ON OPHTHALMOLOGY.

May 17, 1921.

DR. G. ORAM RING, CHAIRMAN.

Double Coloboma (Nasal and Temporal) of the Optic Nerve.

DR. B. ALEX. RANDALL reported the history of a young woman, whose left eye, hyperopic with practically normal vision, has shown no change in the 12 years she has been under observation. Instead of a vertically oval disc as on the right, she presents a large horizontally oval disc with deep central porus and absorbing crescents of the choroid at both lateral margins. Within these, defined by no "scleroid ring," each disc margin shows a dark "bottomless" depression, sharp-cut outward: the one to the nasal side having the upper nasal vessels passing under its margin, somewhat as the other upper vessels are related to the steep edge of the porus. There is no trace of a colobomatous gap in the choroid or iris. Vision and refraction are equal in the two eyes.

It is a matter of interest that the grandmother presented to the nasal side of her left eye a horizontally oval lesion of the choroid, that might readily have been mistaken for coloboma. He had seen this, however, in its first stage as a patch of choroiditis, in the center of which a bleb of retina was

detached by exudate which ruptured into the vitreous and was absorbed, the vague yellow patch of inflamed choroid then going on to atrophy, with pigment heaping at its margins. The first stage of this condition is beautifully shown in Jaeger's plate, but so far as he knew there is no recorded observation of the later stage, as he had the chance to observe it thru a series of years.

Capsulo-Muscular Advancement Without Incision.

DR. S. LEWIS ZIEGLER exhibited a second case of his simplified operation to supplement the one shown before the Section about a year ago.

A capsulo-muscular advancement of the external rectus of left eye was performed by suture alone, without incision, which brought the eye almost into position. This was accomplished by grasping the muscle thru the conjunctiva, about 12 mm. back from the cornea, and entering a double armed suture by a whip-stitch, first thru one margin of the muscle and then thru the other. The needles were then carried forward over the conjunctiva in a line parallel with each muscle margin and inserted in the sclera at the junction, deeply enough to secure a firm scleral anchorage. The suture was tied in a double surgical loop, and the tissues drawn forcibly forward until the necessary reposition was secured, when the second loop of the knot was tied.

This advancement was supplemented by an exploratory incision over the internal rectus of the same eye thru which the tenotomy hook was passed and the muscle stretched above and below. In doing this a small adhesion of the capsule above was found and incised, which relieved the hypertropia and brought the eye back to normal level. A partial tenotomy of this muscle was also performed which increased the freedom of excursion.

A Liebreich patch was worn for a few days. A slight crumpling of the muscle was evident for one week. There was no inflammatory reaction but redness persisted for one month. The single external suture was easily removed on the twelfth day.

Examination now reveals excellent parallel movement of the eyes in all directions with complete restoration of excursion to the left side. The eyes are perfectly straight, altho a slight tendency to overconverge is sometimes noticed when glasses are omitted.

The result shows that three difficulties have been overcome:

- (1) Overconvergence from suppressed image, O. S., relieved by capsulo-muscular advancement of external rectus.

- (2) Old contraction of capsule and internal rectus from disuse, relieved by stretching and partial tenotomy.

- (3) Hypertropia from adhesion of capsule at upper margin of internal rectus O. S., relieved by division of the adhesion.

DISCUSSION. Dr. H. F. Hansell. The simplicity of Dr. Ziegler's operation makes a strong appeal for its performance in preference to those in which the conjunctiva is incised, the capsule of Tenon opened, and the tendon separated at its attachment, or muscular tissue excised. In this patient and in the one that Dr. Ziegler previously exhibited to the Section, the advancement or shortening was combined with tenotomy of the internus. I suggest that equally good or better traction on the sutures could be obtained with the scleral anchorage made by almost hor-

izontally inserted needles rather than by their vertical insertion.

Dr. Zentmayer said that, in this case, as well as the one previously shown by Dr. Ziegler, the capsulo-muscular advancement had been combined with a tenotomy of the antagonist. Almost any advancement operation, if combined with a tenotomy of the antagonist will give a good primary result. Until a case is shown in which no tenotomy has been done, it will be impossible to judge of the merits of Dr. Ziegler's ingenious procedure.

Dr. Ziegler said, in reply to Dr. Hansell, that he purposely did not converge the sutures before anchoring, as this would distort the tissues at the point of fixation and would not maintain the parallel traction which he considered an essential factor in securing a good result. In answer to Dr. Zentmayer's query as to how much of the effect is due to advancement of the muscle and how much is due to division or weakening of the opposing muscle, it is only necessary to measure the effect of the advancement as soon as the operation is completed, providing binocular vision is good enough to elicit diplopia.

He wished to emphasize the need of searching for capsular adhesions on the side of the contracted muscle which often nullify all efforts to correct the strabismus. This can be done by passing the tenotomy hook thru a small incision in the conjunctiva and exploring the tissues both above and below the muscle. If the hook fails to pass freely, the scissors can be slipped into the conjunctival opening and the adhesion gently divided without disturbing the relations. It is often surprising how this simple manœuvre may convert an apparent failure into a success. In this case it relieved the hypertropia chiefly.

Electrically Tinted Optical Glass.

DR. SIDNEY L. OLSHO (by invitation) presented specimens of optical lenses treated by exposure to X-rays produced by a special, selfrectifying, air and water cooled tube, in an apparatus recently perfected. Under this process, American crown glass assumes a light

amber tint after an exposure to 100, 50 K. V. for two minutes. Longer exposure deepens the color. The process is therefore under control. German optical glass develops an amethyst cast. For details of this process see Dr. Olsho's paper, p. 644, A. J. O., September, 1921.

DISCUSSION. Dr. Zentmayer. It seems this glass is an artificially produced amethyst glass offered as a substitute for amethyst glass produced by the action of the sun's rays on certain kinds of window glass. My recollection is that in the table put out by the Bureau of Standards, amethyst glass ranks low in its power of absorption of ultraviolet rays, whereas for this glass the claim is that it absorbs a very large percentage of these rays.

Dr. Olsho stated that the chart submitted shows the affinity of these lenses for the absorption of ultraviolet rays. The amber tinted lenses are the more effective.

Multifocal Lenses.

DR. SIDNEY L. OLSHO (by invitation) presented specimens of finished multifocal lenses, which are designed to take the place of invisible bifocal lenses and were first described to the Franklin Institute, in this city, by their inventor, H. O. Gowlland, of Montreal. The lower or reading portion of this lens presents a continuous variable curve. The periphery of the lower portion is indiscernible. From this periphery there is a gradual accretion of power to the reading centre, the limit being the addition ordered. The lenses are toric in form, ground on a constant -6 D. base, with additions up to 3 D. Any combination is secured by surfacing the other side.

The advantages claimed for this lens are: The possibility of embodying in one lens, powers for the intermediate distances between infinity and the reading distance. There is no sharp jump from the distance to the near focus. The wearer is supposedly able to select a focus for any intermediate distance at will, or may bring matter requiring closest scrutiny into the zone controlled by the carefully

positioned centre. The field for close work is more restricted than in the ordinary bifocal, but this restriction is to some extent counterbalanced by the multiple range. These lenses are known under the trade name "Ultifo."

Groenouw's Nodular Keratitis.

DR. WM. ZENTMAYER presented a woman, aged sixty-eight years, who had discovered accidentally four years ago that the vision in the left eye was much impaired. There was nothing in the personal or family history bearing on the ocular condition. The cornea of the eye showed a group of capacities of greenish-gray color, varying in size from one-half to three mm. and of different contours, one or more of them having a sigmoid shape. The lesions were situated immediately beneath the epithelium, which was elevated irregularly, giving to the surface of the cornea an unevenness. There was no ciliary injection and no history of past inflammation. The right eye showed the beginning of a similar condition. He expressed the belief that the process was probably a dystrophy, but doubted whether tuberculosis was an etiologic factor in this particular type of degeneration.

Central Exudative Retinitis.

DR. WM. ZENTMAYER exhibited a man, aged fifty-one years. Dimness of vision of the left eye was first noticed January 1, 1921. In November, 1920, he underwent an ocular examination in the railroad service, and the vision at that time was normal. The loss of vision was accompanied by marked metamorphopsia and halos. One year ago the patient was ill for several weeks, the condition being diagnosed as nervous prostration. Aside from the ordinary diseases of childhood, this was his only illness. No history of injury. Family history negative, von Pirquet and Wassermann negative. V. R. E., 6/5; L. E., 6/30. External conditions normal. Field of vision, right eye slight temporal contraction, left eye temporal contraction with a central positive scotoma.

Ophthalmoscope: The right eye showed in the macular region a group

of grayish-white, irregular shaped lesions averaging about the diameter of the first branch of the vessels, occupying an area two-thirds the diameter of the disc and having somewhat of a rosette arrangement. In the left eye there was an exudation in the macula about four times the disc in size, with an elevation of about 1 mm. There was a corona of hemorrhage surrounding its margin. Because of the normal functioning of the right eye, the lesion was looked upon as a hyalin degeneration. In the left eye the etiologic factor had not as yet been determined.

Foreign Body Occupying the Orbit and Accessory Sinuses.

DR. T. B. HOLLOWAY gave the history of an injury to the right eye in a boy, aged sixteen years, by the explosion of a piece of wrought iron pipe, which had been loaded with powder. At the time of the explosion he was ten feet from the improvised cannon. Examination July 26, 1920, three weeks after the injury, showed a scar, 5 cm. in length, which extended across the middle of the nose. Moderate proptosis of the right eye and marked chemosis of the bulbar conjunctiva. Cornea hazy, anterior chamber deep, iris discolored, and pupil vertically oval and inactive. Complete loss of outward rotation and distinct impairment of the other ocular muscles. A grayish reflex from the vitreous by oblique illumination. Tension minus 2; no l. p. No mass could be felt about the globe, there was slight tenderness over the lower and inner part of the orbit. Left eye negative, vision 6/6.

An X-ray examination revealed an enormous foreign body, the lower end of which appeared to be free in the nasal cavities with the upper end lodged in the orbit. As extraction from the orbit would be impossible without breaking down the inner wall, Dr. George Fetterolf was called in consultation. He reported "at nasal examination there could be seen and felt a metallic mass at the anterior part of the right nasal cavity between the middle meatus and the septum. Under

either a pair of strong forceps was applied to the mass and by the use of considerable force and after loosening by lateral movements, withdrawal of the foreign body was effected. It proved to be a horizontal section of an iron pipe measuring 42 mm. in length by 12 mm. in breadth. Removal was followed by a small amount of bleeding."

When the patient was last seen on February 17, 1921, the globe still showed a slightly pinkish-yellow injection and distinct evidence of atrophy. No view of the fundus was possible.

An Illuminated Perimeter with Camper Features.

DRS. C. E. FERREE and G. RAND, of Bryn Mawr College (by invitation), exhibited an apparatus devised in response to a request from a committee of the American Ophthalmological Society, for a feasible means of illuminating the perimeter arm with light of good intensity and quality, so that every point on the arm in any meridian in which it might be placed would receive equal intensities of light. Intensity and quality of illumination, however, are only two of the factors which influence the results of the perimeter determination. In devising the apparatus provisions have been made, therefore, for the control of other factors which are of importance. Some of these controls are:

(1) Every point of the perimeter arm in any meridian in which it may be placed receives light of equal intensity and of approximately daylight quality by ammeter and rheostat control. The instrument can be operated on any 110 volt circuit and the results obtained with it are absolutely independent of the variability of daylight illumination.

(2) Provision is made so that the eye, just before receiving the color stimulation, is preexposed to a surface of the brightness of the color as seen at the limits of the color field. The colored stimulus is surrounded also by a field of this same brightness. Variability in these two factors alone may change the limits as much as 20

degrees in some meridians. A further advantage is gained by making the background of the same brightness as the color:—the stimulus disappears completely when the limits of sensitivity to the color is reached, instead of turning into a gray, concerning the colorlessness of which the patient is apt to be in doubt. This gives the effect of the disappearance type of photometer and adds greatly to the ease and certainty of making the judgment.

(3) Accurate provision is made for maintaining the eye at the center of the sphere in the surface of which lies the perimeter arm and of holding a constant and steady fixation. The quick adjustment of the eye is facilitated by three rack and pinion motions. Constancy of relation of the meridians of the retina with the meridians of the field of vision as laid off by the perimeter arm is secured by an especially devised, shape-conforming headrest.

(4) An attachment is provided for controlling the fixation of patients with a central scotoma or pathologic blind area. With the eye properly adjusted for taking the fields, these patients are not able to see a central fixation object.

(5) In order to provide for the mapping of the normal blind spot, and for the quick determination and mapping of central and paracentral scotomata, a tangent screen is added subtending a visual angle of 60 or more degrees. This screen can be quickly and conveniently attached to the stimulus carriage and moved into position.

With the controls provided, a careful worker can reproduce the limits of the color fields within 1 or 2 degrees.

DISCUSSION. Dr. L. C. Peter said it was essential to be able to take fields which can be reproduced. His preference for the tangent screen in perimetric studies has been due to the fact that peripheral field records, altho not nearly so important as central studies, have been entirely unsatisfactory because of imperfect instruments. The sources of error in perimetric work from the clinical standpoint are illumination, variability of

the intensity of the color stimulus, fixation, preexposure, and surrounding field. The perimeter exhibited seems to be as nearly accurate as its practical application in our routine office work demands, without complicating field taking too much by technicalities which will tend to minimize its use. He hoped that some means could be found to have one firm control the manufacture of the instrument, in order that uniformity in the intensity of the color stimuli and the grays necessary for preexposure and surrounding field may be preserved. Without careful attention to this important feature of the perimeter, much of its value will be missed. While Dr. Ferree did not discuss the size of the test object, he believed it should be designated in degrees or fractions of degrees rather than in millimeters.

Dr. Ziegler stated that he had found that electric illumination would yield results differing from daylight and inferior to it. In the first place, the color values are wrong; secondly, the color reactions differ from accepted standards, and thirdly, the fields are too large as compared with daylight findings. These deductions were based on the use of an electric perimeter with transilluminated colors.

The Variable Factors Which Influence the Determination of the Color Fields.

DRS. C. S. FERREE and G. RAND, of Bryn Mawr College, said that the variable factors which influence the apparent limits of color sensitivity are the wave length and purity of the stimulus, the intensity of the stimulus and the visual angle, the length of exposure of the eye, the method of exposure (moving or stationary stimulus), accuracy and steadiness of fixation, the intensity of the general illumination of the retina and its state of adaptation, breadth of pupil, and the brightness of the preexposure and of the background or surrounding field. The most important of these from the standpoint of the work of the office and clinic are the intensity of the stimulus, the brightness of the preexposure and

surrounding field, the intensity of the general illumination and the accuracy and steadiness of fixation.

INTENSITY OF STIMULUS.—By a sufficiently wide variation in this factor alone the fields of color sensitivity may be made to have almost any breadth within the field of vision, to differ radically in shape and even to change or reverse their order of ranking with regard to breadth. For example, with very high intensities the limits of red, yellow and blue are coincident with the limits of white light vision. Green cannot be made to have so wide an extent. With stimuli of medium intensity and of the relative energies found in the prismatic spectrum of a Nernst filament, the limits are concentric and in the order from widest to narrowest of red, yellow, blue and green. With stimuli of medium intensity of equal energy the limits of red, yellow and blue interlace or criss-cross. The limits for green again are narrower. The limits for pigment stimuli may be either interlacing or concentric in the order of red, blue and green or blue, red and green depending upon the intensity of light falling on the perimeter arm. It seems only fair to conclude, therefore, that the conventional clinic rating of the limits from widest to narrowest in the order of blue, red and green is a function of the relative and absolute intensities of the stimuli employed as well as of the actual distribution of sensitivities. Without great precision in the control of intensity, it is obvious that reproducibility of result cannot be obtained and little significance can be attached to extent or shape of field, to order of ranking as to breadth of field, or to any variations from time to time or from person to person in these important features.

BRIGHTNESS OF PREEXPOSURE AND SURROUNDING FIELD.—The brightness of the surface to which the eye is preexposed may change the apparent limits in certain meridians as much as 17 degrees. A preexposure lighter than the color gives a dark after image; a preexposure darker than the color, a light after image. These after images change

profoundly the saturation of the color, also its hue. The brightness of the surrounding field, thru physiologic induction, exercises a similar effect but not so great in amount. The variable effects both of the preexposure and of the surrounding field are strongly influenced by changes in the intensity of the illumination. When the results are obtained under such ranges of change of illumination as may occur during the course of a given day or from day to day, the variability of effect is greatly increased, reaching in some meridians as much as 28-30 degrees. Further important effects of surrounding field as influenced by change of illumination are the changes in hue which the color undergoes in passing towards the periphery of the retina.

CHARLES R. HEED, M. D. Clerk.

COLORADO OPHTHALMOLOGICAL SOCIETY.

MAY 21, 1921.

DR. J. J. PATTEE presiding.

Tuberculous Iridocyclitis.

F. E. WALLACE, Pueblo, again showed a negro boy, aged sixteen years, who had been presented to the society in October, 1920, on account of a severe chronic irido-cyclitis of both eyes, especially the right, and characterized in the right eye by the presence of a number of one mm. deposits on the posterior surface of the cornea, arranged as a triangle with its apex downward. In the right eye there had also been a number of deposits at the angle of the anterior chamber, some of them two mm. in diameter, as well as deposits on the surface of the iris.

The patient had been very irregular in attendance and in his use of medicine, and had disappeared entirely for nearly six months. The right cornea was now somewhat clearer, and the deposits on Descemet's membrane and on the iris had disappeared; those on Descemet's membrane being replaced by a thin plastic exudate plastered on the membrane at about six o'clock. This exudate was arranged in a triangular

form with the base, six mm. long, near the angle of the anterior chamber, and the apex about four mm. upward. Blood vessels ran from the limbus to the region of the exudate. The vision was counting fingers at two feet. Below the lower half of the limbus was a two mm. strip of muddy red thickening. Superficially the left cornea looked normal, but lateral illumination showed clouded areas in it. The vision of this eye was only about 5/60. Around the optic disc of the left eye was a mottled area which gave one the impression of an irregular heaping up of pigment. This area extended about a disc diameter beyond the disc, except at the temporal side where its width was about two disc diameters.

DISCUSSION.—J. A. Patterson, Colorado Springs, remarked that in October, 1920, he had felt that the corneal condition was tuberculosis, altho there was some question whether syphilis might not also play a part. The fundus was suspicious of syphilis.

W. C. Finnoff, Denver. My impression in examining the right eye was that the condition was syphilitic. This impression is supported by the collar of induration below the right cornea and by the fundus lesion. The character of the infiltration in the right cornea suggests tuberculosis. In the left eye the areas of gray or yellow infiltration, with the absence of vascularity of the cornea, are suggestive of tuberculosis. The boy should have tuberculin if he can be got to take treatment, unless he is losing weight, in which case he may have a pulmonary lesion which might be lit up by tuberculin.

A. C. Magruder, Colorado Springs. This case brings up a tremendous economic problem. Here is a boy sixteen years old, who sooner or later will be a burden to the community. Some legal action should if possible be taken to compel the acceptance of treatment in this case.

Chorioretinitis.

F. E. WALLACE, Pueblo, presented a woman, aged twenty-four years, who had first come in 1913 on account of

poor vision in the right eye. The vision at that time had been R. 7/200, I. 20/15, and was still about the same. The right fundus showed an area of alternating white and black patches upon a grayish background, extending about five disc diameters to the temporal side of the optic disc, and measuring about one and a half disc diameters vertically. There was a floater in the vitreous. The left fundus showed large areas of atrophy above and in the upper temporal field.

DISCUSSION.—W. H. Crisp, Denver, suggested investigation as regards the presence of either tuberculosis or syphilis, or of a focal infection.

Cataract Extraction; Congenital Iris Coloboma.

H. M. THOMPSON, Pueblo, again showed a patient who had been presented at the October, 1920, meeting of the society (See AMERICAN JOURNAL OF OPHTHALMOLOGY, Jan., 1921, page 51) on account of cataract complicated by congenital coloboma of the iris, and left microphthalmus with internal strabismus and nystagmus. Cataract extraction had been undertaken on the left eye as being much the poorer eye of the two. The corneal incision was made downward, the incision enlarged with de Wecker scissors, the iris snipped at each lower attachment, and iridectomy done at the upper central part of the pupil. After capsulotomy the lens refused to present. A strong fibrous band was found connecting the lower borders of the iris. After this band was severed the lens was delivered by such pressure on the cornea above as would pretty certainly have forced out the whole of the vitreous of a normal eye. The lens was as large as one from an eye of normal size. A needling had been done ten days before the presentation of the patient, and vision was now fingers at about ten feet. The right eye would be operated upon in a few days.

DISCUSSION.—W. H. Crisp, Denver, suggested that the fibrous band might have represented undifferentiated mesoblastic tissue from the embryonic period. This tissue would normally

be differentiated to take part in the development of the iris, the suspensory ligament of the lens, and the structures at the angle of the anterior chamber.

W. C. Finnoff, Denver, reviewed the embryology of the anterior segment of the eye, and suggested that the fibrous band was a continuation of the sclerous portion of the mesoderm which normally intruded itself thru the choroidal cleft.

Tuberculous Irido-cyclitis; Cure with Tuberculin.

H. M. THOMPSON, Pueblo, again presented a woman, aged twenty-two years, who had been brought before the society in February last (See AMERICAN JOURNAL OF OPHTHALMOLOGY, June 1921, page 461) on account of a pronounced tuberculous irido-cyclitis of both eyes, with a large tuberculoma in the lower outer portion of the left anterior chamber. Under tuberculin there had been marked improvement. The patient felt well, and had gained ten pounds in weight. The temperature had subsided. The right eye had been slow to improve, but in the left eye the iris had changed from a dirty yellow color to a more normal blue, and the tuberculoma had diminished to one fifth of its former size and from being yellow had become white. The former intense ciliary injection of this eye was absent and the tension had become about normal. At present seven mm. of O. T., number 3, every ten days, did not produce any reaction. During the first few weeks of treatment the tuberculin had caused an intense reaction, the eyes becoming inflamed and very painful, and the arm red and swollen from the site of injection to the shoulder, and at the same time general malaise had been marked.

Acute Iritis Following Arsphenamin.

H. M. THOMPSON, Pueblo, presented a man twenty-five years old who had come to the office complaining of blindness having developed while he was driving his car the day before. There had been a possible initial lesion in France eighteen months previously, but a blood Wassermann several weeks

later had been negative, and the examining physician had assured the patient that his trouble was not luetic. A blood Wassermann on May 15, 1921, was positive to all antigens, and a neurologist reported symptoms of central lues. The vision of the right eye was light perception, of the left 20/30. The optic disc and surrounding tissues were greatly swollen, and the general appearance of the fundus was of an inflammation which had existed for many weeks. On May 16, the patient was given 0.4 gram arsphenamin. Twenty-four hours later he developed an acute iritis. Pain and photophobia were intense, and the pupil dilated only slightly under solid atropin. The fundus was seen with difficulty thru the cloudy media. The left eye was free from iritis but on May 20 the vision was down to 20/50.

DISCUSSION.—W. H. Crisp, Denver, described a case of extremely obstinate syphilitic involvement of both eyes of a man about thirty years of age, in whom, in spite of extremely vigorous antisyphilitic treatment, a strongly positive Wassermann had persisted over a period of many months, and dense vitreous opacities had alternately cleared up and become worse again.

W. C. Finnoff, Denver, also related a case in which after very intensive treatment with mercury, neoarsphenamin, and iodids, the patient had developed a heavy dust like opacity in the vitreous. Some one has said, referring to these cases of failure of supposedly specific antisyphilitic remedies, that salvarsan given intravenously passed thru the system too rapidly, and that the logical way to give it was intramuscularly.

J. A. McCaw, Denver, favored using mercury for syphilis, and especially by inunction, to the point of saturation.

F. E. Wallace, Pueblo, also felt that we tended to overlook the value of pushing mercury, but also insisted that when mercury was pushed it was important to take care of elimination.

Iridoplegia from Injury.

J. J. PATTEE, Pueblo, presented a steelworker, aged thirty-two years, who

had come on February 3, 1921, with the statement that while working in the rail mill he had been struck in the left eye with a piece of hot steel as large as a half dollar. There was a gash six by eight mm. in the sclera and conjunctiva to the inner side of the limbus, and both tissues were burned. The pupil was at that time widely dilated and the iris changed in color. The vision of the injured eye was limited to hand movements. At the time of presentation the pupil remained moderately enlarged, and the vision was 20/80. The fundus was normal.

DISCUSSION.—H. M. Thompson, Pueblo, believed in advising all such patients to have the injured eye refracted, not merely to give it the best possible vision, but also to protect the eyes against further injury.

Choroidal Rupture.

J. J. PATTEE, Pueblo, showed a steel-worker, aged nineteen years, who had come on February 8, 1921, on account of injury from a large "fish plate" which struck him in the left eye. The upper lid was punctured to the inner side of the center, and there was a horizontal gash, a half inch long, about a quarter of an inch above the lower margin of the lid. The lower lid was also punctured near its center. The pupil was considerably dilated. The fundus could not at first be examined satisfactorily, but after a few days two crescent shaped ruptures of the choroid were discovered outward from the disc. These were parallel from end to end and about two disc diameters long. One of them passed almost thru the macula. The present vision was merely of hand movements, altho three weeks after the injury the patient could count fingers at six feet.

DISCUSSION.—W. C. Bane, Denver, suggested that in those cases which showed choroidal rupture from a blow, the pupil usually remained dilated.

J. J. Pattee, Pueblo, had seen several cases in which after a blow upon the eye the pupil had remained permanently dilated.

A. C. Magruder, Colorado Springs, had within the past year seen a pa-

tient who had been struck in the eye with a snowball, with resulting laceration of the iris and marked dilatation of the pupil, but in whom the pupil subsequently returned to its normal size.

Phlyctenular Conjunctivitis.

J. J. PATTEE, Pueblo, presented a man whose right eye had a large area of phlyctenular conjunctivitis considerably resembling an episcleritis. There were, however, four or five very fine granular elevations at the limbus. There was infection about the roots of several teeth.

DISCUSSION.—W. H. Crisp, Denver, remarked that the infected teeth were very likely responsible for the condition.

A. C. Magruder, Colorado Springs, referred to a case recently seen in a woman, aged fifty years, in whose right eye inflammatory lesions occurred first over the internal rectus and later over the other muscular insertions, making a complete circle of the eye. The case had been under treatment for three weeks, and the condition had been tentatively diagnosed as episcleritis or scleritis. All her teeth were out. The nasal sinuses were reported absolutely negative, and so was a general physical examination. For the past week five percent dionin had done more good than anything previously used.

WM. H. CRISP,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

MEETING OF MAY 26, 1921.

DR. E. K. FINDLAY, PRESIDENT.

The Specific Reaction to Lens Substance.

DR. LUDVIG HEKTOEN of Chicago read the paper on this subject, published on page 909.

Mature and Immature Senile Cataract.

LIEUT. COL. HENRY SMITH, of Amritsar, India, gave an address on this subject, published in full page 900.

DISCUSSION.—Dr. W. A. Fisher.—It may be interesting to know that Smith has developed a special technic for re-

moving cataract without the assistance of others, as he has always been far removed from medical centers. There is a six weeks' season twice in the year, Spring and Fall, for removing cataracts and during the season 20 to 35 cataract operations are done daily, all by Col. Smith. The dressings are not removed for nine days after the operation and to see more than 200 patients in one hospital with their eyes bandaged is a sight unusual, and not to be seen at any other place on earth.

He does all this with native assistants and only one trained nurse. He has trained everyone of those about him to do his part and they do it well. He has one nonmedical native to boil his instruments, and one to assist in the operation who can hold the lids away from the eyeball as no other one can.

He has presented the advantages and disadvantages of removing the lens in the capsule, and the advantages and disadvantages of the classical operation of opening the capsule and removing the lens, and leaving the capsule in the eye. It would be a simple matter to convince a surgical society that a tumor should be removed in its capsule if it can be done in that manner. A cataract removed in this manner is considered by ophthalmic surgeons to be the best operation that can be done, but many believe the danger too great to even give it a trial.

Dr. Smith deserves great credit for the many suggestions he has given us, and especially his method of holding the lids away from the eyeball, and this method, or some modification of it, will be the means of saving many eyes that otherwise would be lost, whether the intracapsular or capsulotomy operation is performed. About one-third of his students have modified his method of lid control, and I believe some day will modify the operation he so skillfully performs and make it so simple that all operators will remove lenses in their capsules. Colonel Smith admits that Dr. Barraquer of Barcelona, Spain, has perfected an instrument for that purpose which is a modi-

fication of the one made by Vard Hulen of San Francisco.

The greatest objection to the intracapsular operation that is offered by prominent surgeons the world over is that the pressure necessary to remove a lens in its capsule is dangerous, but if an instrument that will successfully pull the cataract out is produced, it will unquestionably obtain a hearing. If the Barraquer instrument is adopted, I believe universal success can only be obtained when the lids are properly controlled, as by the technic of Col. Smith.

Dr. J. W. Millette, Dayton, Ohio read for Dr. J. W. Wright of Columbus: "I am pleased to know that Colonel Smith has so enthused the profession in this operation that much good will eventually result. Altho my experience in this operation compares with that of Dr. Smith's in a very feeble way, I have confidence that the intracapsular operation will be so firmly accepted by the profession in the near future as to be an established procedure, whether the technic is Dr. Smith's or mine, or some modified form."

Dr. Millette continued: For a number of years, I was very closely associated with Dr. Greene of Dayton, Ohio, who introduced the Smith-Indian method into America. I attended him nearly every Tuesday and Friday, when he went to the Old Soldiers' Home to do his work, where most of his cataract work was done. On one of these trips he remarked to me that he had just read Colonel Smith's paper, in the India Medical Journal, in which he described his method of removing cataracts. After reading the description over very carefully, he performed twenty-seven operations, and these were reported to the American Medical Association—which was the introduction of the Smith intracapsular operation into America.

It fell to my lot, upon the death of Dr. Greene to succeed to his work at the Soldiers' Home, and I have consistently employed the intracapsular operation ever since. A few cases of course are done by the capsulotomy

method but most of my work has been intracapsular. I am very enthusiastic about it, and I am certain that I get better results than I would with the capsulotomy method. Few if any of us get perfect results. Many of the papers we read or hear read are misleading, in that they give too good results, not alone in the intracapsular, but in the capsulotomy method as well.

In those operations which were performed by Col. Smith at Dayton, all were quite successful. At the Soldiers' Home, we had 12; 11 of them are perfect results, three of them were simple operations, and the pupils are central. The vision I have not fully tested yet. We had one infection at the Soldiers' Home, and the man himself admits it was his fault, for within three hours after the operation had been performed, he had his fingers up under the bandage.

At St. Elizabeth's Hospital, we had one infection and one hemorrhage. In neither of these two cases, however, did we expect a good result, and Colonel Smith at the time he operated said that he hoped we might have good results. In one, the left eye of the woman had been removed following glaucoma; she had been septic most of her life, and the remaining eye was almost blind from glaucoma and cataract. She had a panophthalmitis following. In the other case, the woman had a nystagmic, tremulous iris, and a very small lens. She has had four children, whose eyes are all of the same character, and there are four or five generations in which this has been maintained, so that there was not much to expect in that case.

In none of these cases at St. Elizabeth's Hospital did I open the eye until Friday of the following week. Colonel Smith had operated on both eyes of an old colored man; a very good patient. I went in Friday morning the week following to see him, I didn't open the eyes. He was in perfect health; seemingly he had a little gastro-enteritis during the week, but that morning he was feeling well. At 10:45 the nurse saw him, and he was feeling well, and at 11:10 they went in to

get his order for luncheon, and he was dead; it was diagnosed apoplexy. The eyes were perfectly healed, and there was no redness, and with a seemingly perfect result."

Dr. W. Benedict, Rochester, Minn. Three years ago, I went on record in the presence of Dr. Fisher, as being in favor of the intracapsular method of cataract extraction. Not particularly the operation we have heard described to us to-night, but in general intracapsular extractions. Early in my work, I read carefully the articles by Colonel Smith and others who have done intracapsular extraction of cataracts and attempted in my own way to follow them, and as my experience widened, to modify their method. Probably now, my extractions are 50-50 intracapsular and by the capsulotomy method. I will say however, that I lean more toward the intracapsular method of extraction, because our complications are fewer and the final results are better.

In most everything that Colonel Smith has advocated, particularly as to the size of the incision, I agree with him. Without any disrespect at all to Colonel Smith, I will say that I feel it is better to traumatize the cornea less and dress the cases earlier. I have very much less fear in looking at an eye that has been operated on in forty-eight hours, than I have to let it go nine days, and that is based purely on experiences that I have had. I believe there is no danger of loss of vitreous interfering with the ultimate vision in certain classes of cases. When fluid vitreous, as we commonly speak of it is lost, I invariably fill the eyeball until it resumes its normal contour, with salt solution, before the eye is closed.

My experience, small as it has been, has also been different from Colonel Smith's in this respect, that on two, and possibly three occasions I have seen secondary cataracts, after an intracapsular extraction. The same condition was described a year ago by Dr. S. Lewis Ziegler, of Philadelphia, which he called an "adventitious membrane." This membrane was so thick that it required needling for better vi-

sion. In one case, this adventitious membrane was evidently due to a hemorrhage in the chamber; in the other, the cause was not determined.

Furthermore, I have had two cases of iritis following intracapsular extraction; in one of these the iritis may have been influenced by infected teeth, in the other, the cause was not determined. I fully agree with him that the presence of a portion of the capsule, rather than the presence of loose lens matter in the anterior chamber may be a cause of iritis.

Dr. W. H. Wilder, Chicago.—I think that there can be no dissent from the statement that Lt.-Col. Smith as well as other ophthalmic surgeons have made, that the removal of the cataract in its capsule is the ideal method. We should like to get rid of the capsule, for its presence so often gives rise to difficulty after cataract. There is no question that excellent results are obtained by the intracapsular method, but it is equally true that excellent results are obtained by the capsulotomy method. The whole question hinges on the relative safety of the two methods.

As an argument in favor of the intracapsular method it is stated that the presence of the capsule after the extraction of the lens is the cause of a great deal of irritation and possibly postoperative inflammation of the eye. With this my own experience does not agree. Of course, if the capsule becomes loosened and entangled in the wound it may delay healing and may even cause serious complication such as glaucoma, but this is very uncommon. Much more frequent is irritation of the eye from the presence in the anterior chamber of unexpelled cortical substance, and I think that it is the cortical substance rather than the remaining capsule that gives rise to the postoperative irritation; and if this cortical substance or most of it can be removed from the eye at the time of the operation, either by gentle manipulation or by irrigation, the case gets well much more promptly, and often without any reaction.

Naturally the difficulty of removing

all of the cortical substance is increased if the cataract is not quite mature, and it would seem to me that in this class of immature cataracts the intracapsular method would have its greatest usefulness if it can be demonstrated to be equally safe. In this connection it is interesting to note that the free cortical substance in the anterior chamber seems to cause much more irritation in the old than in the young eye. How frequently we observe the juvenile cataract being absorbed after dissection with little irritation of the eye, certainly nothing like that which follows when cortical substance in any amount is left after extraction in older subjects.

One point that is emphasized in the excellent paper of Colonel Smith, and I believe by all the advocates of the intracapsular method, is the importance of perfect control of the lids during the operation, and for this purpose a suitable retractor and a skilled assistant would seem to be necessary. Without such control of the lids, the dangers of the method are apparent.

Dr. W. H. Wilder, Chicago.—I cannot let go unchallenged the statement that has been made in the discussion, that loss of vitreous is not such a serious thing. It is one of the most serious accidents that may befall in the course of a cataract operation, and one never can foretell how grave may be its results. Of course, everyone with any degree of experience has had cases that have terminated favorably after vitreous loss of a certain degree. If there is loss of vitreous of any great extent, detachment of the retina or choroid with intraocular hemorrhage may terminate the case then and there. If not so serious as this, delayed healing with cloudy media prevent good vision and stamp the operation a practical failure. We all know the painful sequelae of such cases and if any method can be devised to do the cataract operation with a minimum risk of loss of vitreous, we should certainly welcome it.

So it occurred to me that one of the most striking points in Colonel Smith's paper is this: "Can we in any way block the orbicularis muscle so

that it will be temporarily paralyzed?" He has told us that he has carried on experiments on this subject in attempting to block the seventh nerve. Others have been working along the same line and it seems to me that if anything of that kind could be accomplished, it would be one of the greatest additions to our technic that has ever been offered, because then, such a method as the intracapsular operation could be practiced with much less danger of vitreous loss, even by the less experienced operator.

Until safer technic is perfected, and unless he has had exceptional opportunities for studying and practicing this method, my advice to the younger operator would be to stick to the method which combined experience tells him is the safest one, and I do not want the idea to go out that the loss of vitreous is a trivial matter for altho we may get good results in some cases, we are sure to get some very poor results or failure in many others.

Now that brings out the last point I would like to emphasize, and it is this: there are so many little variations of technic. If a man finds that he has a technic which suits him and with which he is getting good results, unless he readily adapts himself to different methods he had better stick to that, rather than to be constantly changing at every suggestion.

Dr. Oliver Tydings would ask Is there any reason why we should stick to the old in spite of the superiority of the new? A rhinologist who had held the chair of that branch for twenty years in the State University, had never done a sphenoid operation because he had heard a German professor say "No man ever operated on the sphenoid without a death." I will say to any man who will adopt the technic of Col Smith to-day he will soon acquire confidence which will enable him to do a better operation than he will ever do by any other method.

Dr. Outen had seen Col. Smith work in India, and later he had been permitted to operate in his Clinic, and had lost the fear of cataract operations. Don't think the patients who visit Col.

Smith's clinic are ignorant. They are not by any means. Some of the highest intelligence of India has been to that Clinic and the Hindoo is one of the most enlightened men in the world.

Dr. H. W. Woodruff, Joliet, Ill.: The outstanding feature of Col. Smith's paper is its practical nature. My experience with the cataract operation has been small indeed compared with Col. Smith's; but it has been my own and therefore more valuable to me than some one else's experience.

There are objections to allowing operated eyes to remain bandaged and without inspection for as long a period as nine days. The following case will illustrate one of these objections. Ten days after performing a cataract operation, the corneal flap was found protruding between the eyelids. There was no infection but the cornea was naturally very white. This corneal flap could be held in place only by a conjunctival flap; and much to my surprise the cornea regained its transparency after this operation was done; but only after several weeks. Ultimately, useful vision was secured.

Also infection may follow the cataract operation. It is not always painful, and if the eye has not been inspected for nine days the cornea may slough entirely away. Infection is not by any means entirely hopeless if discovered early enough. Many of these cases can be saved by the deep subcapsular injections of solution of cyanid of mercury 1 to 1000. To save infected eyes they should be inspected twenty-four to forty-eight hours after the operation.

By using the Smith hook the inspection of these eyes is easy and safe.

Dr. W. E. Quine being called upon referred to Col. Smith's experience as a general surgeon. He regarded ophthalmology as the most highly developed specialty and congratulated Col. Smith on his great work.

Col. Smith in closing said: The vitreous is much more liable to escape in cases where it is fluid. Then as to determining results of the escape of vitreous, where the vitreous is fluid,

you are not assuming a fair case. An eye that has a cataract in it is not a sound eye to start with, and an eye that has a fluid vitreous is very far from a sound eye; and the results would be much more liable to be bad with the fluid vitreous than with a sound vitreous. Dr. Wilder does not go so far as to say that we despise the escape of vitreous. I don't know that any ophthalmologist despises the escape of vitreous; but we want to see as little of that precious body as we can. It is all a question of how we can see the least of it, and we are just as keen to see as little of it as any man.

I have seen a lot of congenital cataracts, with the cornea from the size of a frog's eye up. Those congenital ones are highly hereditary, and you see three or four in one family, and if you go back a generation, you will find them all with cataracts. These patients are really never sound with a cataractous eye, and when you get one congenital malformation, I think everybody recognizes that you are exceedingly liable to find two or more others in the same patient. You may find them idiotic. Apparently all should go right, and lo and behold, you occasionally get a violent petit mal, so that I would say that your progn-

sis of the patient should not be over-optimistic in the case of congenital cataract. We have to needle them or extract them, but we do not give the patient a very glowing prospect.

As regards the corneal flap being pushed down, I presume, by the upper eyelid, I have not seen those cases, but it might have occurred.

However, I have seen the patient often do his utmost to fix it there on the operating table, and in a case of that sort, I have no hesitation in putting a stitch in the two eyelids. He will have his eye open and get it in this position if he can, but if you will simply put a small stitch in the two eyelids, I think there need not be any further repetition of this experience.

In regard to Dr. Wilder's remarks about the needling of a cataract in childhood. I would say that a cataract in childhood and youth has need for a very careful diagnosis before you touch it. If it is of an opalescent appearance, you can needle it with beautiful results, but if it is a sort of a pale, white cataract you may needle it forty times, and that pale, white, stringy, jelly like appearance will continue, and it will not be absorbed; it should be extracted.

ROBERT VON DER HEYDT,
Corresponding Secretary.

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FUNDUS PHOTOGRAPHY.

If we could photograph the fundus of the eye, what magnificent case records we would have! Especially if it were possible to get the best results that are now attained in color photography. Memory plays strange tricks with us, which we only recognize when memory is checked up with a new examination, or some less changeable record. Few of us are artists capable of reproducing even approximately the forms and colors that we see. Those who can do so can only find time for a very few of the many ophthalmoscopic pictures that pass before them day after day; and those who hire an artist to paint for them can only do it for a few of the most important conditions encountered. This being the situation, we still must hope for advances in photography. A better understanding of its limitations as applied to reproducing the appearances seen at the back of the eye, may help the development of its possibilities.

Photography is easy in proportion to the amount of light coming from the

object to the sensitized film or plate. Very feeble light will suffice if the exposure is long enough. Stars quite invisible to the eye may be photographed by prolonged exposure. But prolonged exposure is impossible for the background of the eye. Even very slight movement during the period of exposure is fatal to the clearness of the picture. The retinal details that it is desired to record are very minute, and correspondingly easily blurred by movement. It is hard enough to keep the head still for portrait photography, except with a wide angle portrait lens, that will take all the light from the face and concentrate it on a relatively small area of the plate and so make the impression with a short exposure. It is even more difficult to keep the eye perfectly still, for any length of time, than it is to hold the head still.

Then in the kind of light given off from the back of the eye to the photographic film, there is another special difficulty to be overcome. The photographic film is most affected by the "chemical rays," the short wave light

and ultraviolet rays; and it is least affected by the red rays of the spectrum. But the action of the dioptric media is such that practically none of the ultraviolet radiations reach the retina; and very little of the light from the violet end of the spectrum is returned from the ocular fundus. The predominant color of the light returned from the background of the eye is red, the light that makes the least impression on the photographic film and requires the longest exposure.

Another special difficulty in fundus photography is caused by the reflexes from the dioptric surfaces, particularly the anterior surface of the cornea. We know how the corneal reflex often complicates ordinary ophthalmoscopy. It can readily drown out the fundus image, and must be gotten rid of to photograph the fundus. Only the most perfect "reflexless" system of illumination can give valuable results. This makes it necessary that the light shall enter the eye thru one part of the pupil, and shall emerge to enter the camera thru a totally different portion. This, with the need for getting all the light possible, makes it necessary to have the pupil widely dilated.

But the dilated pupil always exposes marked aberration at its periphery, and light coming thru this periphery tends to blur the photographic picture. The ideal arrangement would be to have the light enter thru the periphery in such a way as to be evenly diffused over the fundus, and then to admit to the camera only the light passing out thru the central area of the pupil, having the most regular refraction. The methods thus far found practicable have used one-half of the pupil to admit light, the other half to photograph thru. Or, as done by Dimmer, the light is brought in thru one edge of the pupil, and emerges to the camera thru the other parts of the pupillary area.

Finally the essential structure and dioptric properties of the eye itself, limit the application of photography in recording the appearances seen with the ophthalmoscope. In an emmetropic eye, or

one wearing its refractive correction, parallel rays are only perfectly focussed on the central part of the retina. The rays coming from points on the periphery of the visual field will be focussed behind the retina, the eye is hyperopic except for the point looked at, and the area adjoining it. The surface at which rays are focussed on secondary axes is not a plane, but neither is it the retinal surface. It is a curve that passes thru the fovea and behind the peripheral portions of the retina. Points on this curved surface might all be perfectly focussed by the camera, but not the peripheral portions of the fundus that lie in front of this curve. Not all parts of the photographic picture can be perfectly focussed in any case: and this limits the distinctness of detail that can be attained thruout a large part of the picture.

Of course structures having different depths, like the edge and bottom of a glaucoma cup, or the apex of a swollen nerve head and the unswollen retina around it, cannot both be shown distinctly in the same picture; as the artist can portray them with his brush, or as the eye can see them with the ordinary ophthalmoscope, by an almost unconscious adjustment of accommodation or distance. Eyes with irregular astigmatism, hazy media, nystagmus, or such poor vision in the fellow eye as to prevent accurate fixation, would all be unsuited to giving even such results as photography might obtain from other eyes.

Fundus photography has attracted the interest of ophthalmologists ever since they have used the ophthalmoscope. The writer attempted it in the earliest years of his work in ophthalmology, but accomplished nothing worth publishing. In this country Howe has worked at it, and H. D. Noyes reported his efforts in 1862. But it was not until 1891 that Gerloff, and later Thorner and Wolff, got useful pictures by application of their "reflexless" ophthalmoscopes. Dimmer, who has done the most in this direction (see p. 939), uses an electric arc light, with a suitable condensing system and

diaphragm, obtaining a pencil of rays that is reflected into one edge of the pupil. The emergent rays are received in a specially devised camera. The patient's head is carefully fixed, and his eye fixed by direction of its fellow. The picture is taken with all extraneous light carefully excluded from the apparatus.

In this way is obtained a negative that can be enlarged to 4 or 5 times the diameter of the structures shown, about one-third the enlargement of the ordinary ophthalmoscopic image by the direct method. Dimmer's pictures are about 36 mm. in diameter, and they are not sharp enough to bear any further enlargement. Nordenson and Wertheim-Solomonson, using the lens system of the large Gullstrand ophthalmoscope, have gotten slightly greater enlargement (5.5 to 6 diameters); but it is manifest that such pictures cannot exhibit the finer details that we are accustomed to study with the ophthalmoscope.

However, as Dimmer points out, it is worth a good deal to have even an outline of the exact topography of the fundus, upon which the finer details can be sketched in. It is possible that the instrument and its use can be so simplified that fundus photography can be more widely applied for this purpose. Dimmer has been able to take his pictures with an exposure of $1/20$ of a second. It is possible that transillumination from the nose or pharynx, might be so perfected as to furnish an illumination free from the drawback of reflexes, and sufficiently strong to allow even shorter exposures. At any rate it is worth while for the wideawake ophthalmologist to have in mind what can be done by fundus photography, and along what lines greater usefulness is to be expected for it.

E. J.

THE YEAR 1921.

Altho the year has been a difficult one for printers and publishers THE AMERICAN JOURNAL OF OPHTHALMOLOGY and OPHTHALMIC LITERATURE have been published regularly without lowering their standards and without any

financial deficit. In the matter of colored plates we have been able to offer fewer than we wished, but in this we have done better than any other ophthalmic journal in the world. To make the improvements already planned and which are needed to make these journals of the highest usefulness to their readers we must still have the loyal support of our subscribers. The list grows a little each month. But there are thousands of ophthalmologists in America alone who need such a journal but do not take it. Other methods will be tried but the best way to bring it to the attention of such colleagues is by the personal mention of those who take and read our journal.

INDEXES.

Completing the fourth volume of this series of the AMERICAN JOURNAL OF OPHTHALMOLOGY this number has included with it the indexes of authors' names and topics for the current year. These are found at the end of this number preceded by the title page, and the list of plates. In binding the volume it is intended that they should be placed at the beginning of the volume, preceding the January number.

CORRECTION.

The boundless possibilities of overlooking omissions and errors until the whole thing is printed is illustrated on page 632 of the August number in the omission of the first name of George E. de Schweinitz. Probably no reader was left in uncertainty by that omission but the name is so familiar that it would seem as tho proof readers if not printers would note the error. Yet it was more than three months before the Editor had his attention called to this glaring defect on an editorial page.

Lest any ambiguity be left in the mind of the reader it should be mentioned that Dr. de Schweinitz graduated in Medicine in the spring of 1881: but he spent two years as interne in the University Hospital and was engaged in general practice, so that it was about six years after graduation that he began to teach ophthalmology.

BOOK NOTICES.

The American Encyclopedia and Dictionary of Ophthalmology. Edited by Col. Casey A. Wood, M.R.C., U.S.A., M.D., D.C.L. Assisted by a large staff of collaborators. Fully illustrated. Vol. XVIII, pp. 13545 to 14122. Chicago, Cleveland Press. 1921.

The editor of this great work is to be congratulated upon its completion, the collaborators may view with pleasure their connection with such an honorable achievement; and the publisher can feel satisfied with the way he has kept faith with his subscribers in bringing out in such difficult times the work undertaken along its original lines, altho in such a novel undertaking it was impossible to know at the beginning just what was involved in it. But the greatest benefit has come to all English reading ophthalmologists in that so much of what is known about ophthalmology has been brought together under systematic, alphabetic arrangement. Every one who wishes to know all he can of ophthalmology will find this his most important work of reference.

Altho this volume carries the list of topics to the end of the alphabet, ending as it does with "zygotes," it is greatly to be hoped that there will be one more volume, containing an index, and supplementary articles that will bring the work, begun in 1913, entirely up to date. The Encyclopedia Britannica has been worked on over 150 years, until its arrangement is most carefully elaborated. But a whole volume of nearly 1000 five column pages is given to its index and classified table of articles; and those who use that encyclopedia know that this volume is the most useful single volume of the 29. Next to it in usefulness and interest will doubtless be the supplementary volumes which are announced to bring the work from 1911 up to date. We shall look forward to such a supplementary volume of the American Encyclopedia of Ophthalmology as the one that really completes the work.

The longest article in this volume,

293 pages, is entitled; "War, Medicine and Surgery in." It is really a continuation of the one of 116 pages in Vol. X, on "Military Surgery of the Eye," and is by the same author, Lloyd Mills of Los Angeles. The two taken together, with certain shorter articles that are crossreferenced here, would constitute an extended and fairly complete monograph, containing adequate presentation of all about the lesions of the eye and related parts, that has been published, especially the literature of the last 7 years.

Next to this in length, 43 pages, comes the section on Visual Economics by E. E. Holt of Portland, Maine. This article is arranged in numbered paragraphs convenient for reference. It relates the compensation for loss of sight to that proper for other disabilities from injury; and is based on the view that money compensation can be justly estimated by mathematic formulas. A third collaborator, whose contributions rank with those above mentioned in extent, is T. H. Shastid, who contributes to this volume about 110 biographic sketches. Most of them are quite brief; but taken with those in preceding volumes, they complete a fairly full history of those who have built ophthalmology as we know it today, especially complete with reference to American ophthalmologists.

Our notices of this series of volumes would be incomplete, did we fail again to call attention to the immense amount of labor that has been done on them by their Editor. The work is sometimes spoken of as "Wood's Encyclopedia." Yet we doubt if those who so speak of it often realize to what an extent the name is appropriate. In this volume, of less than 600 topics mentioned, 410 are treated by the Editor. Many of these are mere definitions of a line or so in length; but 30 of them are each longer than one page, the longest being 27 pages. Altogether they occupy about one-fourth of the whole volume. Again congratulations to this indefatigable worker. Appreciation of what he has done for his profession will come to him so long as he

lives. But doubtless, what he most enjoys now is the feeling that here is a good piece of work finished; with time and strength left to turn to other self-imposed tasks, equally interesting, equally creditable and truly serviceable to his fellow-men.

E. J.

Der Augenspiegel und die ophthalmoskopische Diagnostik. von Dr. Friedrich Dimmer. Professor in Wien. Third Edition. Octavo. 646 pages, 16 plates and 146 figures in the text. Leipsic and Vienna. Franz Deuticke. 1921.

This is the third edition of Dimmer's book, the first having been issued in 1886 and the second in 1893. But so much has been added that it fairly merits consideration as a new work. Altho the first 35 years of use of the ophthalmoscope opened a new field in ophthalmology, the second thirty-five years has shown greater scientific and practical progress in this field than in almost any other department of ophthalmic medicine. This is the largest and most complete work upon its subject that has yet appeared, and its material has been well chosen, and is described without unnecessary multiplication of words.

The characteristic feature of a work on ophthalmoscopy is usually its collection of colored plates. In this work such plates are replaced by plates of photographic reproductions of the ophthalmoscopic appearances. There are 10 such plates, including 150 figures; 8 plates, 120 figures, are from photographs of the fundus of the living eye; while 2 plates, 30 figures, are photographic reproductions from colored plates. They illustrate a wide variety of normal, anomalous and pathologic conditions. Of the first 6 plates, 5 are given to photographic reproductions of the normal and pathologic histology of the parts seen with the ophthalmoscope, and one to reproductions of more or less schematic representations designed to explain the things seen.

A comparison of these photographic representations of the living fundus with those of the more familiar color

sketches, rather emphasizes the real truth of the latter; altho the high scientific value of the photographic representation is also brought out in the former. The photograph cannot supplant the colored plate in teaching the student the color value of the ophthalmoscopic picture; but it can give lines, areas and relations that are exact and may serve to correct any habitual errors of the artist. An appendix of 5 pages to Chapter I supplemented by 3 illustrations explains the arrangement and operation of Dimmer's apparatus for photography of the fundus.

The book is divided into two parts. The first begins with an optical introduction taking up the reflection and refraction of light and the optical system of the eye. Then comes a chapter on the ophthalmoscope and its use, with appendices on the microscopy and photography of the ocular fundus. The next chapter takes up the normal eyeground, with a note on the fundus oculi of lower animals. The final chapter of the first part is devoted to the measurement of refraction with the ophthalmoscope, both by the erect and inverted images and a section of 50 pages on the shadow test. This last section is by Prof. Salzmann and is an exceptionally clear and thoro exposition of the optical principles of skiascopy.

The second part is devoted to the diagnostics of the ocular changes visible with the ophthalmoscope. It first considers those of the refractive media and iris; and here includes ophthalmoscopy of the angle of the anterior chamber, as worked out by Trantas, and especially by Salzmann. Then, proceeding to the fundus conditions, the first chapter is given to the optic nerve entrance. The second chapter takes up those of the retina, choroid and sclera. Two-thirds of the book are given to the discussion of the changes visible with the ophthalmoscope and their significance, illustrating the greatness of the subject and furnishing the student, intent on mastering this subject, a safe and complete guide.

In general the language is clear, and not difficult reading for one who has

some reading knowledge of German. The full table of contents, 6 pages, and the index, 7 pages, makes it valuable as a book of reference. While it gives no complete bibliographies, the rather frequent references open out the general literature of the subject; and among these references, the American literature is fairly represented.

E. J.

Oculo-Refractive Cyclopedia and Dictionary. Thomas G. Atkinson, M.D., B. Sc. The Professional Press, Inc., Chicago. (See also p. 876.)

This is a book of 432 pages, with numerous illustrations, arranged, as the author states, to give complete information to the practising refractionist with a minimum of difficulty or trouble. The paper and printing, as well as many of the illustrations, are excellent, but the proof reading leaves much to be desired. For example, in the first sentence is the statement: "Abducens. A descriptive name given to the sixth pair of cranial nerves, because their function is to enervate the external rectus muscles" etc., when what is really meant is to *innervate* the external *recti* muscles. Another instance is on page 66, where "blennorrhea" instead of *blennorrhoea* is found. On page 80 appears "buphthalmia" and immediately below it is "bupthalmos."

The above are a few of the mistakes found in a cursory glance over the book. As to the information to be obtained, it was rather interesting to find on page 319 that the temporal lobe on each side is the center of pure vision. If by pure vision is meant the correlation of visual with other sensations, this should be stated, but as nothing is said about the occipital lobes, the meaning seems to be that the visual centers are in the temporal lobes. On page 321 is the statement that the "elevation in which is the opening of the lacrymal sac is called the lacrymal papilla." This is true in the same way that the mouth is the opening of the stomach, but is hardly accurate anatomy. On page 320 we find: "O. U. An abbreviation for both eyes (oculus unity)." The correct meaning is *oculus uterque*. Again,

the above are taken at random, and indicate the presence of other mistakes.

After finding so much to criticise, it is pleasant to find many articles worthy of commendation, such as the definition and explanation of retinoscopy, frame fitting, accommodation etc. But in the opinion of the reviewer, the errors are so great and so many, that the book cannot be recommended until it has been thoroly gone over and these eliminated.

C. L.

CORRESPONDENCE.

Dr. de Schweinitz' Visit to Peking.

To the Editor: At the dedicatory exercises of the Peking Union Medical College held in Peking, China, Sept. 15-22, 1921, the majority of the trustees of the College and a number of eminent scientists representing Europe, Canada, United States, China and Japan were present. Among the trustees present were Mr. John D. Rockefeller, Jr., Dr. George E. Vincent, Dr. Wm. H. Welch of Johns Hopkins and Dr. Francis W. Peabody from Harvard.

Among the visiting scientists who came as guests of the Rockefeller Foundation were such persons as Dr. George E. de Schweinitz and Dr. John G. Clark of Philadelphia, Dr. Florence R. Sabin of Baltimore, Dr. S. S. Goldwater and Dr. Victor Heiser of New York, Dr. A. B. Mac Callum of Toronto, Dr. R. T. Leiper of London, Dr. T. Tuffier of Paris, Dr. S. Hata of Japan and Dr. Wu Lien Teh of China.

It was a great privilege and a special delight to have Dr. de Schweinitz with us as the representative of the specialty of ophthalmology. Such a representation was all the more fitting because Dr. de Schweinitz came also as the President-elect of the American Medical Association, and in that capacity brought official greetings from the Executive Council of that body.

Dr. de Schweinitz gave the salutatory address of the dedicatory exercises on Thursday, September fifteenth, which he followed by a scienti-

fic paper entitled "Concerning the Evolution of the Ocular Symptoms of Pituitary Body Disorders." This paper was admirably supplemented by charts and lantern slides.

The program of the department of ophthalmology during the following days of the conference was as follows:

Friday, September sixteenth:

Eye operations by Dr. H. J. Howard and Dr. T. M. Li.

1. Combined extraction of cataract with insertion of sclero-conjunctival suture.
2. Dissection of secondary cataract.

Saturday, September seventeenth:

Presentation of cases of toxic amblyopia and focal infections.

1. Retrobulbar neuritis with amblyopia caused by eating peppers and vinegar, the latter probably containing methyl alcohol..... Dr. T. M. Li.
2. Quinin amblyopia Dr. H. J. Howard.
3. Iritis caused by chronic prostatitis..... Dr. T. M. Li.
4. Vitreous opacities and diminished vision caused by periapical tooth abscesses.. Dr. H. J. Howard.

Dr. de Schweinitz, Dr. Sudaroff of Petrograd, Dr. Neville of Mukden, and Dr. Howard participated in the discussion.

Monday, September nineteenth.

Eye operations by Dr. H. J. Howard and Dr. T. M. Li.

1. Tenotomy of right inferior oblique for traumatic paralysis of the left superior rectus and spasm of the right inferior oblique.
2. Tenotomy of the right inferior oblique for paresis of the left superior rectus.

3. Resection of the the left externus and graduated tenotomy of the left internus for left esotropia.

4. Complete tenotomy of the right internus for right esotropia associated with marked amblyopia.

Tuesday, September twentieth.

Presentation or report of some interesting cases that came to the hospital of the Peking Union Medical College in 1920-1921.

1. Two cases of neuroepithelioma. Dr. H. T. Pi.
2. A case showing a hole in both maculae due to simultaneous injury..... Dr. T. M. Li.
3. A case of marked symblepharon produced by the malpractice of a native quack..... Dr. T. T. Dzen.
4. A case of absolute glaucoma of both eyes in which linen threads had been inserted for filtration and experimental purposes..... Dr. H. J. Howard.

Wednesday, September twenty-first.

Eye operations by Dr. T. M. Li.

1. Heisrath's resection of the tarsus for chronic trachoma and ptosis.
2. Modified Snellen's operation for trichiasis.
3. Expression of follicular trachoma.

Thursday, September twenty-second.

Presentation of cases.

1. Primary optic atrophy due to syphilis..... Dr. T. M. Li.
2. Tuberculous uveitis..... Dr. H. J. Howard.

Address by Dr. George E. de Schweinitz on "Some newer aspects of uveal tract disorders and therapeutic measures for their relief."

HARVEY J. HOWARD.

Peking, China.

ABSTRACTS

Lafon, Ch. Nystagmus. *Ann. d'Ocul.* v. 157, 1920, p. 529-569. (See also A. J. O. v. IV p. 149.)

The first point discussed is nystagmus and *spasmus nutans*. There are three forms of the latter, of which only one is associated with nystagmus, viz. rotation of the head around its vertical axis. It usually disappears at about 2 or 3 years, rarely persists until 7 or 8; but the author has seen it at the age of 30. The nystagmus present is almost invariably of the horizontal variety. It has been suggested that *spasmus nutans* is a compensatory movement of nystagmus, also that the nystagmus is an effort on the part of the child to supply the movement of objects, to which he has become accustomed, when the head is quiet. The author gives the reasons for rejecting both theories. The explanation he proposes is that as soon as the infant becomes conscious enough to perceive the movement of objects, he attempts to compensate it by head movements which quickly become habitual. But when the sensation of movement disappears, the oscillation persists and becomes independent of the nystagmus. But there must be an underlying psychic disturbance of equilibrium, for the spasm to develop.

Monocular Nystagmus. According to the literature, this condition is very rare. The author reports 3 cases. In the first, the left eye deviated outward, but on attempts at convergence, the divergence diminished and the eye turned downward. In every position, it showed a vertical nystagmus of mild rhythm and slight amplitude, unaffected by exclusion of the right eye. In the second case, with end results of ophthalmia neonatorum in the right eye, this showed a slight convergence with horizontal nystagmus. This, in the primary position, was replaced by rotatory movements, of slight amplitude and irregular rhythm. This disappeared in the lateral position while the amplitude was greater and the rhythm retarded. This was more pronounced on looking towards the right. On look-

ing down or fixing an object, the nystagmus became much less. This was true, also, when the left eye was covered. In forced convergence, it even disappeared. In the third case, the right eye turned out decidedly. During fixation, in any position, it showed fine horizontal nystagmus. On fixing a very close object with the left eye, the right hardly moved, but its nystagmus ceased. When the left was covered, the right showed oscillations of great amplitude and irregular rhythm, but when it was covered, the fine movements were not affected. The author explains monocular nystagmus on the ground that the eye being amblyopic and strabismic lacks the proper power of convergence, which the other eye possesses.

Congenital Nystagmus. As far as can be determined, nystagmus ceases during sleep. During narcosis, it ceases before the disappearance of the reflexes, and does not commence until consciousness reappears. In congenital nystagmus, in 21 patients with normal ears, no case showed abnormal reaction or difference between the labyrinths. No cerebellar trouble was found in any patient.

Vestibular Nystagmus. Convergence has a tendency to inhibit vestibular nystagmus, however evoked. In spontaneous vestibular nystagmus, the movements usually appear only in extreme laterality, and the patient avoids them by not looking to the side. Where they are great enough to bother the patient, he avoids them by converging.

Cerebral Nystagmus. In some affections of the central nervous system, there is nystagmus and diplopia, the latter being transient and requiring careful examination to elicit it. This is a manifestation of an excess of convergence made by the patient in order to diminish the nystagmus. The only difference between cerebral and vestibular nystagmus is one of degree and not of kind, the cerebral having a tendency to become stronger and permanent.

Occupation Nystagmus and Convergence. Miners' nystagmus is polymorphic,

but all show certain common features: it increases on looking up and decreases on looking down; fixation in the primary position increases it, in lateral it is checked; it disappears with discontinuance of the occupation. This form is therefore entirely different from the congenital.

Voluntary Nystagmus. 17 cases have been reported, including one by the author. He regards it as a disturbance in the tonic equilibrium between the controlled muscles, due to an excessive attempt at convergence. The same explanation will probably apply to simulated and to hysteric nystagmus.

The author discusses at length the theories of Sauvigney, H. Coppez and Bard and maintains that they do not explain the conditions satisfactorily. He summarizes his own position as follows:

1. All voluntary movements of the eyes are associated ones, governed by the functions of direction and convergence. These functions are of cortical origin, arising not from one center but from several, associated sensorial centers scattered thru the cortex. They are coordinated by centers located probably in the mesencephalon, which transmits them to the oculomotor nucleus. There may exist, also, supranuclear, intermediary and subcortical centers. The vestibular apparatus is connected directly and indirectly, by way of the cerebellum, with the oculomotor apparatus.

2. Congenital nystagmus is a static trouble of one of the elementary functions (laterality, verticality or rotation) of cortical origin, due to a developmental taint. The function of convergence possesses an inhibitory action on nystagmus. When this is impaired by an error of refraction or an intrauterine or postnatal ocular lesion, nystagmus is likely to appear, as is also convergent strabismus. In congenital nystagmus, no lesion of the vestibule or cerebellum is found.

3. Lesions of the cerebellum and vestibule cause nystagmus by virtue of their effect on the function of direction. Since they usually arise after convergence is well developed, the nystagmus usually appears only in extreme lateral positions, which are incompatible with strong con-

vergence. The only difference between spontaneous and provoked nystagmus is that the former is bilateral and the latter unilateral.

4. Occupational, voluntary and hysteric nystagmus are muscular tremblings caused by fatigue or strong contractions. Here the function of direction is not injured, but does not act directly. They are pseudonystagmus, as are the nystagmic movements seen in pareses or contractions of the ocular muscles.

5. From a pathogenic standpoint, true nystagmus is an entity. There are two varieties from an etiologic basis—congenital and acquired. Of the latter there are two subdivisions—labyrinthine and cerebral.

C. L.

Lindner, K. An Endemic of 56 Cases of Gonoblennorrhea. Klin. M. f. Augenh. v. 65, 1920, p. 637.

On March 25, 1916, 14 soldiers with gonoblennorrhea were sent to the eye department at Lublin, the next day 11, then 8, 5, 7, 3, 2, 1, 1 and much later 1, altogether 56. 48 were bilateral and came from the 1st and 4th company. In his search for the origin of infection, Lindner found on the 4th day that a student of pharmacy of the first year, acting as substitute for the reserve surgeon, had inspected the reporting eye patients daily, everted the lids of each and instilled 10% protargol, without washing his hands between. Thus the first patient who had infected his eyes from his gonorrhea was the originator of this terrible endemic.

By very careful treatment, however excellent results were obtained. In only 2 cases ulceration of the cornea, and in one perforation, occurred; altho 10 patients were over 40, 4 over 50. The majority were in the twenties. The endemic was not mild. Some cases were very severe, so that after subsidence of the acute symptoms the previously extended and then relaxed tarsus showed vertical folds. The treatment consisted in irrigations with pinkish solutions of permanganate of potash every 10 to 15 minutes and applications of nitrate of silver, 2%, twice a day.

C. Z.

Hirsh, C. Air Embolism of Central Retinal Artery after Irrigation of Maxillary Sinus. *Klin. M. f. Augenh.* v. 65, 1920, p. 625.

The right maxillary sinus of a boy, aged 16, was irrigated for removing mucopus and after the fluid had run off, air was blown into the antrum with a clysopump and the canula taken out of the accessory ostium. At this moment the patient said that he could not see with his right eye. The ophthalmoscopic examination about one minute later revealed: palpebral fissure larger than left, eyeball freely movable, perhaps a little protruding, pupil unusually wide, did not react at all. Fundus diffusely grey, disc markedly white, veins normally filled, arteries appeared as white glistening bands without blood. Gradually from the periphery streaks of blood appeared in the arteries, between which air containing parts were visible. The blood columns migrated toward the centers, and after 2 or 3 minutes the blood current was restored, the disc lost its pallor, pupillary reaction and vision returned. The picture corresponded with Stargardt's experimental air embolisms in monkeys and dogs. From this case and literature the author concludes that the phenomena after injection of air into the maxillary and other nasal accessory sinuses, so far interpreted as irritations of the pneumogastric and other reflexes, are to be attributed to air embolisms. To avoid them, the inflation of air and irrigation with strong solutions of peroxid of hydrogen are to be discarded. The accessory ostium is the place for irrigations

with aseptic or antiseptic solutions, as here the least possible lesions occur in perforating the window. C. Z.

Kubik, J. Meningismus after Ganglion Anesthesia. *Klin. M. f. Augenh.* v. 66, 1921, p. 290.

The right eye of a girl, aged 10, of weak constitution, was enucleated under local anesthesia with 2 ccm. of a 1% novocain-adrenalin solution, injected into the ciliary ganglion, on account of absolute glaucoma with secondary hydrophthalmus. After 12 hours, the child became restless with marked rigidity of the neck, turning back of the head, pain on movement of the head, convulsive cries, abolition of patellar reflexes, i. e. meningismus. On lumbar puncture the fluid rushed out under high pressure and was of sanguinolent color with a greenish hue, but with no pathologic changes. Temperature subfebrile. The condition was very much improved after this, and normal on the 4th day.

Kubik thinks it most probable was that the injection needle entered too far and injured a cerebral vessel, causing a slowly increasing hemorrhage. The other explanation was that the injection of the novocain solution into the cranial cavity caused toxic phenomena. This was the first complication of this kind observed at Elschmig's clinic after innumerable ganglion anesthetics. However, the same occurred in a man, aged 20, but the meningismus lasted only a day, and in a decrepit woman, aged 45, in whom the symptoms disappeared within 10 days after 3 lumbar punctures of hemorrhagic fluid. C. Z.

AMERICAN OPHTHALMOLOGIC SOCIETIES. GENERAL.

Following is a list of the ophthalmologic societies of the United States, as complete as possible. It is known that there are several societies not shown in this list, but it was not possible to obtain any information regarding them. If the secretaries of the societies not shown here will send information to the Editor of Society Proceedings, a supplementary list will be published.

H.S.G.

GENERAL SOCIETIES.

Section on Ophthalmology, American Medical Association.

Chairman—Dr. N. M. Black, Wells Bldg., Milwaukee, Wis.

Secretary—Dr. G. S. Derby, 7 Herford St., Boston, Mass.

Meeting—May, 1922.

Place—St. Louis.

American Ophthalmological Society.

President—Dr. William M. Sweet, 1205 Spruce St., Philadelphia, Pa.

Secretary—Thomas B. Holloway, 1819 Chestnut St., Philadelphia, Pa.

Meeting—May, 1922.

Place—Washington, D. C.

American Academy of Ophthalmology and Oto-Laryngology.

President—Dr. Walter R. Parker, David Whitney Bldg., Detroit, Mich.

Secretary—Luther C. Peter, 1529 Spruce St., Philadelphia, Pa.

Meeting—September, 1922.

Place—Minneapolis, Minn.

LOCAL SOCIETIES.

Buffalo Ophthalmic Club.

Secretary—Dr. R. A. Edson, 498 Delaware Ave., Buffalo, N. Y.

Meeting—2nd Thursday each month—October to May. 7:30 P. M.

Place—Varies.

Chicago Ophthalmological Society.

President—Dr. E. K. Findlay, 30 N. Michigan Ave., Chicago, Ill.

Secretary—Dr. M. Goldenburg, 104 S. Michigan Ave., Chicago, Ill.

Meeting—3rd Monday of each month, 8 P. M.

Place—Sherman Hotel, Chicago.

Colorado Ophthalmological Society.

Secretary—Dr. W. H. Crisp, Metropolitan Bldg., Denver, Colo.

Meeting—3rd Saturday of each month. 7:30 P. M.

Annual Congress, last week in July.

Place—Denver, Colorado.

Detroit Ophthalmological Club.

Secretary—Dr. N. Bentley, David Whitney Bldg., Detroit, Mich.

Meeting—2nd Wednesday in each month. 8 P. M.

Place—Wayne County Medical Bldg., Detroit, Mich.

Eye and Ear Section Los Angeles County Medical Association.

President—Dr. J. M. Brown, Brockman Bldg., Los Angeles, California.

Secretary—Dr. J. H. McKellar, Title Insurance Bldg., Los Angeles, Calif.

Time—First Monday of each month.

Los Angeles Ophthalmological Society.

Secretary—Dr. J. Ross Reed, Citizens' Bank Bldg., Pasadena, California.

Meeting—Third Wednesday night of each month from October to May.

Place—Varies.

Object—More study than discussion.

Memphis Society of Ophthalmology and Oto-Laryngology.

Secretary—Dr. S. S. Evans, Exchange Bldg., Memphis, Tenn.

Meeting—2nd Tuesday each month. 8 P. M.

Place—Baptist Hospital, Memphis, Tenn.

Milwaukee Oto-Ophthalmic Club.

President—Dr. J. Gordon, Milwaukee, Wis.

Secretary—Dr. J. E. Guy, 307 Grand Ave., Milwaukee, Wis.

Meeting—3rd Tuesday of each month. 8 P. M.

Place—Milwaukee, Wis.

Minnesota Academy of Ophthalmology and Oto-Laryngology.

President—Dr. J. A. Watson, Physicians & Surgeons Bldg., Minneapolis, Minn.

Secretary—Dr. J. H. Morse, Donaldson Bldg., Minneapolis, Minn.

Meeting—2nd Friday of each month. 8 P. M.

Place—St. Paul and Minneapolis, Minnesota, alternately.

New England Ophthalmological Society.

President—Dr. F. H. Verhoeff, 101 Newbury St., Boston, Mass.

Secretary—Dr. W. H. Lowell, 101 Newbury St., Boston, Mass.

Meeting—3rd Tuesday of each month. 8 P. M.

Place—Massachusetts Charitable Eye and Ear Infirmary, Boston, Mass.

New York Ophthalmological Society.

President—Dr. H. S. Miles, Bridgeport, Conn.

Secretary—Dr. B. Samuels, 33 West 52nd St., New York.

Meeting—2nd Monday of each month. 8 P. M.

Place—Varies.

Omaha and Council Bluffs Ophthalmological and Oto-Laryngological Society.

President—Dr. J. B. Potts, Brandeis Theatre Bldg., Omaha, Neb.

Secretary—Dr. C. Rubendahl, Brandeis Theatre Bldg., Omaha, Neb.

Meeting—3rd Wednesday of each month. 8 P. M.

Place—Varies.

Philadelphia College of Physicians, Section on Ophthalmology.

Chairman—Dr. G. O. Ring, 17th and Walnut Sts., Philadelphia, Pa.

Secretary—Dr. C. R. Heed, 1205 Spruce St., Philadelphia, Pa.

Meeting—3rd Tuesday of each month. 8 P. M.

Place—22nd and Ludlow Sts.

Pittsburgh Ophthalmological Society.

President—Dr. E. B. Heckel, Jenkins Bldg., Pittsburgh, Pa.

Secretary—Dr. A. Krebs, Jenkins Arcade Bldg., Pittsburgh, Pa.

Meeting—1st Monday of each month. 8 P. M.

Place—Varies.

Portland Academy of Ophthalmology and Oto-Laryngology.

President—Dr. R. A. Fenton, Journal Bldg., Portland, Ore.

Secretary—Dr. C. G. French, 1st National Bank Bldg., The Dalles, Ore.

Meeting—Monthly.

Place—Varies.

Puget Sound Academy of Ophthalmology and Oto-Laryngology.

President—Dr. Allison Wanamaker, 817 Summit Ave., Seattle, Washington.

Secretary—Dr. Albert F. Mattice, 614 Cobb Bldg., Seattle, Washington.

Meeting—4th Monday of each month except summer months.

St. Louis Ophthalmic Society.

President—Dr. A. E. Ewing, Metropolitan Bldg., St. Louis, Mo.

Secretary—Dr. W. F. Hardy, Metropolitan Bldg., St. Louis, Mo.

Meeting—4th Friday of each month. 8 P. M.

Place—University Club, St. Louis, Mo.

Rhode Island Ophthalmological Society.

President—Dr. A. A. Fisher, 331 Broad St., Providence, R. I.

Secretary—Dr. J. L. Dowling, 57 Jackson St., Providence, R. I.

Meeting—2nd Thursday of October, December, February and April.

Place—Medical Library, Providence, R. I.

Wills Hospital Ophthalmic Society.

President—Dr. B. Chance, 1305 Spruce St., Philadelphia, Pa.

Secretary—Dr. C. O'Brien, Wills Hospital, 1810 Race St., Philadelphia, Pa.

Meeting—1st Tuesday and 1st Wednesday of alternate months. 8 P. M.

Place—Wills Hospital, 1810 Race St., Philadelphia, Pa.

Sectional Societies.**Pacific Coast Oto-Ophthalmological Society.**

President—Dr. F. Stauffer, Deseret Bank Bldg., Salt Lake City, Utah.

Secretary—Dr. E. D. Lecompte, Boston Bldg., Salt Lake City, Utah.

Meetings—Annual. Next meeting in May, 1922.

Place—Salt Lake City, Utah.

Sioux Valley Eye and Ear Academy.

President—Dr. F. I. Putnam, Sioux Falls, So. Dakota.

Secretary—Dr. L. N. Grosvenor, Huron, So. Dakota.

Meeting—January and July.

Place—January meeting in Sioux City, Iowa, July meeting in Omaha, Neb.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn. Volunteers are needed in other localities.

DEATHS

Dr. Pierre L. Leonard, St. Joseph, Missouri, aged fifty-nine, died September twelfth, after a long illness.

Dr. E. Schneider of Copenhagen died recently. His ophthalmic table was made up from frozen sections of the normal eye.

Dr. Chas. DeWitt Conkey, Duluth, Minnesota, aged sixty-five, died September eighth, at Los Angeles, following an operation for gallstones.

Dr. Gustav A. Aschman, Wheeling, West Virginia, aged sixty-one, died October second, from chronic nephritis and uremia following an operation.

Dr. Walter Lytle Pyle of Philadelphia, died suddenly at his home in Merion, October eighth, from heart disease, at the age of forty-nine years.

Lt. Col. F. P. Maynard, I. M. S. (Retired), died at his home, Audlem, Cheshire, England, September 30, at the age of 57 years. He had recently engaged in practice at Crewe, England.

PERSONALS

Dr. G. I. Hogue, Milwaukee, Wisconsin, has been appointed President of the recently created State Bureau for the Care of the Blind.

Dr. Stuart H. Bowman has located at Stamford, Conn., with offices at 386 Atlantic street, where he will limit his practice to eye, ear, nose and throat.

Mr. J. B. Lawford has been offered the honorary LL.D. of McGill University, and is going to Canada this autumn to receive it. He is an alumnus of that University.

Dr. Kaspar Pischel, of San Francisco, California, who was the first ophthalmologist to perform the Elliot operation for glaucoma in America, is spending a brief vacation in Honolulu. He is making a tour of the Orient and expresses himself as wonderfully pleased with the climate, bathing, etc. of Honolulu.

It has been recently announced that Doctor Hilliard Wood, who has been teaching Ophthalmology and Oto-Laryngology in Nashville for thirty years, has resigned from the faculty of Vanderbilt University. His work will be taken by Doctor M. M. Culom and Doctor W. G. Kennon.

Dr. Ernst Fuchs, of Vienna, was a guest of the Ophthalmological Section of the New York Academy of Medicine the evening of October seventeenth, and read a paper on "Presbyopia." He has been giving a course of lectures in New York on the histology and pathology of the eye.

Drs. James P. Matheson, Clarence N. Peeler, and Henry Lee Sloan of Charlotte, North Carolina, recently purchased a site for \$60,000, and will erect thereon a modern hospital to cost \$125,000 to be used exclusively for the treatment of eye, ear, nose and throat cases. It will be four stories high, with one floor devoted to the private offices of the above named physicians.

Brisseau of Tournai, Belgium, published in 1705 the first account of the nature of cataract. Before that cataract was thought to be a pouring out of some substance on the lens from above, hence the name "cataract." On September twenty-fifth a memorial to Brisseau was unveiled. The Committee in charge have reproduced in pamphlet form his original article as a souvenir. For information address Dr. A. de Mets, 29 avenue Van Eyke, Antwerp.

The second edition of "Yacht Cruising," by Claud Worth affords one more illustration of the versatility of some eye surgeons. It is an expert treatise on cruising, from experience gained during the brief holidays of a busy professional career.

Dr. Frank Allport of Chicago has the sincere sympathy of his friends in the loss of his wife, who died on September twenty-third, following an operation. Mrs. Allport will be sadly missed, not only by her large circle of personal friends, but by the numerous charitable organizations with which she has been actively engaged for many years.

Dr. Casey A. Wood has received the honorary degree of LL.D. from McGill University, which assembled in special convocation on October thirteenth, to celebrate the one-hundredth anniversary of its founding. During his very brief stay in Montreal, Dr. Wood delivered a lecture on "Some Birds I Have Known." The address, which was illustrated with lantern slides, was under the joint auspices of the Province of Quebec Society for the Protection of Birds and of the Natural History Society.

Charles F. Prentice, M.E., of 201 Singer Building, New York City, a well known optometrist, founder of the optometric profession, and author of numerous books and articles on ophthalmic lenses and prisms, including many in the American Encyclopedia of Ophthalmology, has retired from practice and settled permanently at Nelson, B.C. Mr. Prentice is the inventor of the prism dioptre, the unit of prism power now widely accepted in the United States. He also originated the optical terms, prism dioptre, contrageneric, dioptral, photostat, typoscope, chiasmal image and contrameniscus.

SOCIETIES

Prof. J. Van der Hoeve, of Leyden, Holland, addressed the Section of Ophthalmology of the College of Physicians of Philadelphia, October 20. His subject was "Development of the Lacrimal Canal in Normal and Abnormal Conditions."

At the same meeting, Prof. Ernest Fuchs, of Vienne, gave an illustrated address on "Senile Changes in the Optic Nerve, and Senile Amblyopia."

The American Academy of Ophthalmology and Oto-Laryngology have recently decided to establish a museum to be located in the Army Medical Museum at Washington, D. C., and conducted by the curator, the expenses to be borne by the Academy.

At the last meeting of the American Academy of Ophthalmology and Oto-Laryngology the following officers were elected: President, Dr. Walter R. Parker, Detroit; Vice-Presidents, Dr. Ross H. Skillern, Philadelphia, Dr. W. L. Benedict, Rochester, Minn., Dr. John J. Shea, Memphis, Tenn.; Treasurer,

Dr. S. H. Large, Cleveland, Ohio, Secretary, Dr. L. C. Peter, Philadelphia.

At the September meeting of the Indiana State Medical Association, Section of Ophthalmology and Oto-Laryngology, Dr. J. A. Stucky of Lexington, Kentucky, was the guest of honor and addressed the Section on the subject, "Some Phases of the Trachoma Problem." Eighty members attended this section. The officers of the section for the coming year are: Chairman, Dr. Charles H. McCaskey, Indianapolis; and secretary Dr. E. M. Shanklin, Hammond. Drs. Albert E. Bulson, Jr., of Fort Wayne, and George F. Keiper, of Lafayette, were elected to the House of Delegates of the American Medical Association, by the House of Delegates of the Indiana State Medical Association.

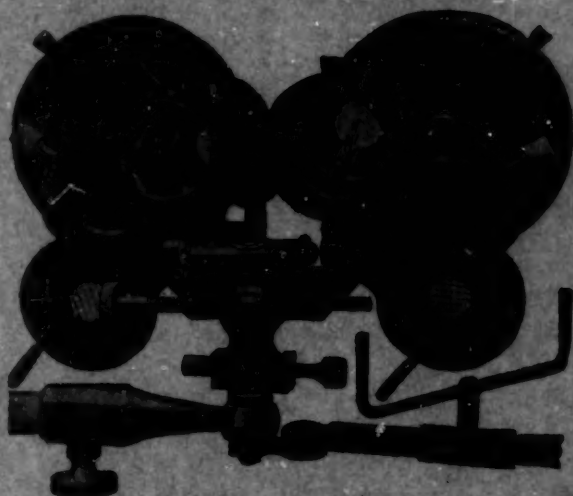
At the meeting of the Chicago Ophthalmological Society, October 24th Dr. J. Van der Hoeve, of Leyden, Holland read a paper on "Affections of the Eye Induced by Undue Exposure to Light Rays," and Dr. Robert Von der Heydt a paper on "Physiologic Hyaloid Artery Remains."

MISCELLANEOUS.

The Graduate School of the University of Minnesota, Minneapolis, has announced a special one year course in ophthalmology and oto-laryngology, which began September twenty-eighth.

A Chicago physician was recently fined \$300 by Judge Jacobs in the Des Plaines police court for failure to report three cases of sore eyes in infants under his care. Two of the babies are hopelessly blind, while the third, it is said, has a possible chance of recovery.

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